# THE AMERICAN GAS LIGHT JOURNAL

REDMAN & KENNY, N.Y.

PUBLISHING OFFICE No. 32 PINE STREET

DEVOTED TO THE INTERESTS OF ILLUMINATION, VENTILATION, WATER SUPPLY AND DISTRIBUTION, & GENERAL SCIENCE.

VOLUME LXII.—No. 14 Whole No. 1,035. | NEW YORK, MONDAY, APRIL 8, 1895. | $3 PER ANNUM, IN ADVANCE.

A. M. CALLENDER & CO., Proprietors. C. E. SANDERSON, Manager.
JOS. R. THOMAS, C.E., Editor. T. J. CUNNINGHAM, Asst. Editor.

ENTERED AT THE POST OFFICE AT NEW YORK, N. Y., AS SECOND-CLASS MATTER.

**Published** on each Monday of the year, at No. 32 Pine Street, New York.

**Terms of Subscription, Including Postage** —For the United States and Canada, $3 per annum. European countries, $4.50 (19 shillings—22½ francs). All payments to be made in advance. Single copies, 10 cents.

**Remittances** should be made either by post office order, express money order, registered letter, or bank draft on New York, payable to the order of A. M. Callender & Co.

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**Correspondence.**—Wishing to make this JOURNAL a gazette of intelligent discussion to those of our readers who may wish to gain or give information on the subjects to which its columns are devoted, correspondence is solicited for publication from all who make the study of those subjects a pleasure or a profession.

*The Public Lighting Tables of the American Meter Company will be found in the page advertisement of that Company.*


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[OFFICIAL NOTICE.]

### April Meeting, Guild of Gas Managers.

OFFICE OF THE SECRETARY, March 30, 1895.

The April Meeting of the Guild of Gas Managers will be held in Young's Hotel, Boston, Mass., at noon, 13th inst.

A. K. QUINN, Secretary.

[OFFICIAL NOTICE.]

### April Meeting, Society of Gas Lighting.

OFFICE OF THE SECRETARY, March 28, 1895.

The April meeting of the Society of Gas Lighting will be held at The Arena, No. 39 East 31st street, on Thursday, the 11th inst., at 3 P.M.

FRED. S. BENSON, Secretary.

## BRIEFLY TOLD.

GREEN, KETCHAM & CO. HAVE NOTHING TO DO WITH THE NATIONAL GAS AND WATER COMPANY—Last week we were obliged to make public certain matters connected with the business standing of P. J. Green and C. W. Ketcham, who had conjointly made application for opposition gas charters for certain named places in the State of Illinois. The published facts did not tend to support the solvency of either of the parties named; on the contrary, the facts did show that the Green-Ketcham combination relied chiefly on the words from their own mouths to show how much they were worth. Disinterested inquiry, however, soon put each of their tubs on its own bottom, which bottoms were rotten to the point of disintegration. Amongst other statements made by the parties named was one to the effect that they represented, or were financially interested in the Cicero (Ills.) gas plant, which is controlled by the National Gas and Water Company, of Chicago; and we took occasion to say that that statement was in no sense accurate. If proof were needed that the latter assertion was so, we submit it is furnished in the following letter, received by us on the 4th inst.:

OFFICE NATIONAL GAS AND WATER COMPANY,
CHICAGO, ILLS, April 2d, 1895.

To the Editor AMERICAN GAS LIGHT JOURNAL: We notice item in your issue of April 1st, containing the following reference to us: "Mr. Green's associate is Mr. C. W. Ketcham, a broker of Chicago, who is reported to be a representative of the Rew soft coal process people of his city." Also, your comment on the same, which is as follows: "We believe, too, it is absolutely accurate to say that Ketcham in no sense has any connection with the proprietors of the Rew gas making process." We beg to confirm you absolutely in your belief as stated. Yours truly,

NATIONAL GAS AND WATER CO., N. A. MCCLARY, Gen. Manager.

MR. C. M. COBURN CAN NOW "TELL THE TIME OF DAY."—The caption might be a trifle misleading to those who are not personally acquainted with the genial gentleman who represents the Alden Speare Company, of Boston; but it will not be misconstrued by any of the Eastern gas men who know him—which is tantamount to saying that all the Easterners have met him and are with him—for Coburn is pretty well up to knowing always where he is and wha the is doing, and why

he does it. Still, we repeat our leading thought in the caption, as he has been in the possession of a very handsome gold chronometer since the evening of March 29th, on which evening he was inveigled into visiting the residence of Mr. Wm. A. Anderson, at No. 425 Meridian street, Boston—we assume everybody knows that Anderson is the Superintendent of the East Boston Gas Light Company. Somehow or another many of Coburn's friends found out that he, on the day (and evening) in question would celebrate the golden anniversary of his birth, wherefore they determined to put him in mind of the fact that, once past 50, the case of *vita brevis* is best remembered by him who can recall *tempus fugit* by examining as often as he likes the dial of a handsome watch—excuse the "purity" of the Latinesque remarks. Well, having safely housed their 50-year old boy, the latter was confronted by a group of more than a score of Eastern gas men—well tried and true ones, too—and in due course of time the recipient knew what it was all about. The presentation was made by Mr. C. F. Spaulding, of Waltham, and Coburn, who would ordinarily not be nonplussed over the notification, without prior warning, that he had been appointed to take charge of Mr. J. E. Addick's bank account, was about as voiceless as an amateur attacked with stage fright, and as equally composed. Still, he got through with it in the end all right. I did not mean to mention any names other than those of the presenter and the recipient, but a sense of justice obliges me, simply as a reminder, that those who were inflicted by and suffered from his act resent his doings, to report that Harry B. Leach, of Taunton, recited a poem during the course of the evening that almost caused Coburn's watch to stop. It is needless to add that Host Anderson was a host, and that the entire proceedings were typical of the Eastern gas man at his best. I ought to mention another name; and I shall. It is that of Mr. C. H. Biglow, of Waltham, whose mellow notes of song were so chromatic that many feared we would soon lose him—now that Impressario Abbey is scouring the land for someone to replace the de Reszke's, and others.—OBSERVER.

INSPECTOR PATTERSON HOLDS TO HIS STATEMENT OF A YEAR AGO.—A year ago Mr. James W. Patterson, Inspector of Illuminating Gas and Gas Meters, for Allegheny county, Pa., in his report of the workings of his office for 1893, took occasion to say that the consumer of gas obtained a better lighting service, at a very much less expense, than did the user of artificial light who depended on electric currents and incandescent lamps for his supply. These statements of the Inspector provoked much criticism (unfavorable, of course) from the electric lighting suppliers; but, having had a further twelvemonth in which to study the matter, the Inspector sees no reason to change his views thereon, for in his report for 1894 (copious abstracts from which will be found in our current item columns) he boldly says—referring to the relative efficiency and economy of electric lighting and gas illumination, as commented upon by him a year ago: "I still hold the views therein expressed, as well as the opinion that gas does not cost more than one-fourth as much as electric light, where the electric plant is operated on a paying basis." From Mr. Patterson's report it may not be successfully denied that the Gas Companies in and around Pittsburgh are in pretty good condition, or that they are keeping the best of faith with their consumers, since the gas supplied by them exceeds by 41 per cent. the candle value prescribed by the ordinances governing them.

NOTES.—In our telegraphic correspondence respecting the Springfield meeting of the Ohio Association it was stated that Mr. Howard Jones, of Circleville, O., had been elected a member of the Executive Committee. This was an error, as the gentleman so elected is Mr. T. C. Jones, of Delaware, O.——A correspondent informed us some days ago that the Chicago agency of the American Meter Company was to be discontinued. Inquiry at the headquarters of the Company in this city, however, discloses the fact that no such thing was ever even contemplated. The Chicago agency is not only to be continued, but it is proposed to make it become a more important link in the Company's system than heretofore.——The stockholders of the St. John (N. B.) Gas Company have agreed to amalgamate with the local street railway company. Under the merger the apportionment of capital will be: Railway shareholders, $600,000; Gas Company shareholders, $400,000; and of the nine Directors the Gas Company may name four.——The Ontario Legislature has refused to rescind the provision in the Hamilton Gas Light Company's charter which guarantees to it exclusive rights in perpetuity.——Mr. B. F. Pugh, who has figured as the "financial power" behind the Peoples Co-operative Gas Company, of Chicago, refused to pay a bill of $24 rendered him for printing by the Martin Grace Printing Company, and now Pugh has no office furniture. A constable removed it to satisfy the Grace claim.——The Massachusetts Legislature has refused to sanction the bill which proposed to put the Board of Gas and Electric Light Commissioners under a single head.

## PROCEEDINGS OF THE ELEVENTH ANNUAL MEETING OF THE OHIO GAS LIGHT ASSOCIATION.

HELD AT THE ARCADE HOTEL, SPRINGFIELD, O., MARCH 20 AND 21, 1895.

### FIRST DAY—MORNING SESSION.

The President, Mr. J. W. R. Cline, of Springfield, in calling the meeting to order, said: The Eleventh Meeting of the Ohio Gas Light Association is now ready for business. The reading of the minutes of the last meeting will be dispensed with, as they have already been published. The next business in order is the

### REPORT OF EXECUTIVE COMMITTEE.

The Executive Committee makes the following recommendations: *First*—That Messrs. A. F. Nash, J. A. Faux and J. P. Gwynn be appointed a Nominating Committee. *Second*—That Messrs.

| | |
|---|---|
| Backus, Q. S., Williamsport, Pa., | Hastings, J. L., Phila., Pa., |
| Bowen, W. S., Phila., Pa., | Hauk, C. D., " " |
| Byers, C. A., Heverford, Pa., | Henderson, E. H., Pittsburgh, Pa., |
| Collins, D. J., Chicago, Ills., | Miller, C. R., " " |
| Doherty, H. L., Columbus, O., | Mansur, J. H., Royersford, Pa., |
| Gregory, J. M., Bellefontaine, O., | Schmidt, E. G., Sandusky, O., |

be elected to Active Membership. *Third*—That Messrs. H. M. Hubbard, T. A. Bates, A. E. Rood, Chas. F. Webster and C. V. Newman be released from membership at their request. *Fourth*—That Messrs. J. M. Armstrong, J. H. Phillips, W. S. Ley and John M. Skinner be dropped from membership.

J. W. R. CLINE,
IRVIN BUTTERWORTH,
E. T. MCCORMACK,
W. C. BOYLE,
G. W. MCCOOK,
T. C. JONES,
} Executive Committee.

On motion of Mr. Persons the report was accepted.

The President—The next thing in order is the

### REPORT OF THE SECRETARY AND TREASURER.

| | |
|---|---|
| New members admitted last meeting | 12 |
| Released from membership last meeting | 9 |
| Elected from active to honorary membership | 1 |
| Present number of active members | 163 |
| Present number of honorary members | 13 |
| Badges on hand | 19 |

*Financial Report.*

| | | | |
|---|---|---|---|
| Receipts— | | | |
| Balance beginning of year | $460 66 | | |
| Received from initiation and dues | 371 00 | | |
| Received for badges | 18 00 | | |
| Received for proceedings of 1894 meeting | 100 00 | | |
| | | | $949 66 |
| Expenditures— | | | |
| Stationery and printing | $153 24 | | |
| Expenses of Executive Committee | 21 25 | | |
| Telegraphing | 4 55 | | |
| Postage | 25 00 | | |
| For reporting proceedings of meeting, 1894 | 100 00 | | |
| Salary of Secretary | 300 00 | | |
| Balance on hand, certificate of deposit | $152 81 | | |
| Cash | 192 81 | | |
| | | 345 62 | |
| | | | 949 66 |

Respectfully submitted, A. P. LATHROP, Sec. and Treas.

Approved: IRVIN BUTTERWORTH, W. C. BOYLE, GEO. W. MCCOOK, } Finance Committee.

On motion, the report was accepted.

The President—We will now have the reports of the special committees. Mr. Welch will report for the

### COMMITTEE ON TAR.

Mr. Welch—The Chairman of this committee being absent, it devolves upon me to make the report. The mission of this committee expired last year, but was continued until this year for the purpose of keeping in touch with the market condition and to receive any information that might be of interest or benefit to the companies. I have discovered nothing new; but in fact I have given the matter very little attention. The committee exists now without any apparent object, nor did it realize its fullest hopes in what it undertook. The Association is perfectly familiar with the report of last year and what was done. I understand the Columbus plant has been very successful and is doing what others might have done had the recommendations of the commit-

tee been carried out. The Columbus Gas Company has not only consumed the tar that it made, but is reaching out for other tar; so that it seems that we will have more market for the tar of some of our companies.

Mr. Persons—I move the acceptance of the report, and that it be placed on file. (Adopted.)

Mr. Welch—I do not know that the committee accomplished anything, and I do not see any reason why it should be continued in existence. It might, however, be interesting at this time to hear some remarks from Mr. Butterworth, who can give some facts with reference to his plant, which produces it at much less cost in proportion than smaller plants.

Mr. Butterworth—I do not care to make any extended or detailed report with reference to our plant. I will say, however, that we built our plant last spring, and it cost in the neighborhood of $4,300. We have run it for a year very successfully, and are very well satisfied with the results.

The President—Is it the desire of the Association that the committee shall be continued? If not, a motion in reference to it will be in order. If the Association has no suggestion to make in reference to the matter, we will pass it. Next, we will hear the report of the

COMMITTEE ON FEDERATION.

Mr. Faben, who is Chairman of that Committee, is absent, and as Mr. Butterworth is next on the Committee, we will ask him to make the report.

Mr. Butterworth—I have been requested by Mr. Faben, Chairman of your Committee on Federation, to submit a report in his absence of their work. We met in Cleveland last May, on the occasion of the annual meeting of the Western Gas Association, and discussed the Federation matter with members of similar Committees from other Associations. A Constitution and By-Laws of the proposed Federation were drafted and left in the hands of the Sub-Committee for completion. As completed it was presented to the members of the American Gas Light Association, at the annual meeting in Washington last October, and, after quite an animated discussion, a motion to adopt the same, as far as the American Association was concerned, was lost. The proposed scheme of Federation has, therefore, had quite a back-set; but in my opinion it possesses sufficient merit to warrant the prediction that it will sooner or later be revised and put into execution, with probably some modifications. In the meantime, as a small and local Association like ours could hardly be expected to take the initiative in a matter of this importance, I suggest that your Committee on Federation be discharged. If you desire a more complete report as to what the proposed Federation scheme contemplated, I can read the Constitution and By-Laws that I have referred to; but you have all probably read them in the GAS LIGHT JOURNALS, and in the American's *Quarterly*.

The President—What is the pleasure of the Association with regard to the report?

On motion of Mr. Persons, the report was accepted and the Committee discharged.

The President—Next in order will be the

ROLL CALL.

| | | |
|---|---|---|
| Brown, E. C. | Hayward, S. F. | Prichard, W. W. |
| Abbott, E. D. | Hedges, W. C. | Printz, E. |
| Adams, C. F. | Higgins, C. M. | Roots, D. T. |
| Allen, G. A. | Holmes, B. P. | Roper, G. D. |
| Boyle, W. C. | Jones, T. C. | Russell, D. R. |
| Bredel, F. | Kendall, J. R. | Salter, J. |
| Butterworth, I. | Lathrop, A. P. | Sheets, E. D. |
| Callender, E. P. | Light, J. | Shelton, F. H. |
| Clapp, G. N. | McCook, G. W. | Spinning, D. C. |
| Cline, J. W. R. | McCormack, E. T. | Stacey, F. A. |
| Coombs, M., Jr. | McDonald, Donald, Louisville, Ky. | Stacey, J. E. |
| Cressler, A. D. | | Stephens, J. G. |
| Crisp, G. E. | McDonald, Donald, Albany, N. Y. | Stout, J. |
| DeArmon, C. W. | | Stratton, S. S. |
| Dell, J. | McIlhenny, J. D. | Tayler, G. H. |
| Dickey, G. S. | McLain, C. M. | Taylor, O. P. |
| Dickey, P. S. | Maguire, A. B. | Van Wie, E. G. |
| Douglas, H. W. | Matt, G. | Warmington, D. R. |
| Faux, J. A. | Marden, C. A. | Watt, R. |
| Gribbel, W. S. | Nash, A. F. | Welch, C. H. |
| Guldlin, O. N. | Osius, G. | Whysall, G. |
| Gwynn, J. | Penn, J. | Wickham, L. |
| Harper, H. D. | Persons, F. R. | Wones, W. R. |
| Harris, J. A. | Powell, J. H. | |

LETTERS AND TELEGRAMS.

The Secretary—I wish to say that I have received letters and telegrams from the following gentlemen, stating their desire but inability to be present: C. J. R. Humphreys, A. S. Bushnell, C. R. Faben, Jr., F. E. Barker, John H. McElroy, A. E. Boardman, W. H. Pearson, C. F. Prichard, Walton Clark, J. W. Dunbar, Geo. T. Thompson, G. W. Clabaugh, John P. Harbison, R. T. Coverdale, Chas. D. Lamson, Burdett Loomis, Henry B. Leach, Jas. Somerville, Chas. H. Dickey, Geo. H. Harper, Geo. G. Ramsdell, H. H. Hyde, A. S. Miller, Frederic Egner, Isaac Baxter. General Bushnell, of the Springfield Gas Company, had hoped to be present, but was obliged to go away some time ago on account of ill-health, and the following dispatch was received by Mr. Cline:

LOS ANGELES, CAL., March 19th, 1895.

J. W. R. Cline, President Ohio Gas Light Association: Please present my regards to the members of the Association, and express to them my regrets that I cannot be present at their meeting. A. S. BUSHNELL.

TWO SPECIAL COMMITTEES.

The President—I have just learned of the death of Mr. H. C. Felt, and I will appoint, as a Committee to draft a suitable memorial, Messrs. Donald McDonald, John D. McIlhenny and Philip S. Dickey. I will appoint as a Committee on Place of Next Meeting Messrs. C. H. Welch, Jerome Penn and W. W. Prichard. Some distinguished gentlemen and prominent gas men, who travelled long distances to be with us, are here this morning, and we are glad to welcome them I notice Mr. E. H. Jenkins, Superintendent of the Gas Company of Columbus, Ga. The Association will be glad to hear from Mr. Jenkins.

Mr. Jenkins—I am most happy to be with you to-day. For the last three years I have tried to attend your convention, but have been unsuccessful until this morning. I shall take great pleasure in learning what I can from you. It gives me much pleasure to meet my old friends again.

The President—I notice, also, Mr. E. C. Brown, publisher of Progressive Age, of New York.

Mr. Brown—I, too, like Mr. Jenkins, have been very anxious to attend your meetings, and it has also seemed that one thing or another, entirely unforseen, has prevented me from being present. Now that the way is broken, I hope to come often.

The President—We would like to hear from Mr. E. G. Cowdery, Manager of the Western Gas Company, of Milwaukee, Wis.

Mr. Cowdery—I thank you for your welcome, gentlemen. I do not know that I have anything to say at this time. I am very glad indeed to be with you.

The President—I also notice Mr. Hauk, of Philadelphia.

Mr. Hauk—Gentlemen, I am very glad indeed to be with you this morning. This is my first opportunity to meet with the Ohio Association, and I am delighted to meet so many of my friends, and hope I shall have the pleasure of meeting with you often.

The President—We do not desire to overlook any of the gentlemen. We would like to hear from Maj. Hastings.

Major Hastings—After the severe cold winter we have just passed through, I am only too glad to be present and meet with the gentlemen.

The President here read his inaugural address, for which see the JOURNAL, issue of March 25, p. 406.

On motion of Mr. Butterworth, the Secretary appointed Messrs. Boyle, Gwynn and Douglas a Committee to consider the President's Address, with instructions to report thereon at a later session of the meeting.

The President—The next thing in order is a paper by Mr. E. T. McCormack upon the subject:

## WHAT PROPORTION SHOULD HOLDER CAPACITY BEAR TO MAXIMUM OUTPUT?

(See JOURNAL, issue of April 1, p. 446.)

*Discussion.*

The President—This subject is of very great interest to gas people, and I would like to have it discussed thoroughly. Mr. Clapp has had some experience, and we would like to hear from him.

Mr. Clapp—I think, Mr. President, I am somewhat of a fanatic in regard to holder capacity, the same as the author. I think sufficient holder capacity is a great economizer, but what per cent. it would require to economize in manufacturing gas I have never heard. I think the capacity should be sufficient to take care of the variation of the consumption. In the small works we have from 15 to 20 per cent. variation. I think holder capacity should be sufficiently large to take care

of the consumption, so that we can go right along making a regular amount of gas every day—that is, making coal gas. With water gas, I understand it does not make very much difference, because one can make as much or as little as he wants to in a few hours. My experience is that the holder capacity should be sufficient to take care of the variation in the consumption of gas, whatever that might be.

Mr. Prichard—We have had a good deal of experience in this line, which will be understood when I say that, with a holder capacity of about 55,000 feet, some days we run as high as 115,000 feet. I find it costs us, for extra labor, at least $90 a month, simply for want of holder capacity. A large number of shoe factories are in our city, and sometimes they take a notion to run until 9 o'clock at night without any notice to us. I have been contending with our Directors for some time for a new holder. It is very hard to make a regular amount of gas.

Mr. Butterworth—I think we all recognize that it would be extremely shortsighted business policy for a gas company to have insufficient holder capacity. It is a matter of great importance to provide ample storage capacity. Gas companies have a great advantage over electric light companies, by virtue of being able to make and store their product, whereas the electric light companies are at a disadvantage in that respect, by having to make the light as it is wanted. I think possibly there may be such a thing as going to the extreme. I heard of one case this morning in which there is an output of about 30,000 or 40,000 feet, and a holder capacity of 140,000 feet. Their business may grow to it in time, and they are better off on that side than on the other.

Mr. Douglas—In the case of a water gas company in our vicinity, the output of which I think does not run over 50,000 feet, they formerly had a holder of about 25,000 feet. Then they erected a relief holder of about 100,000 feet, and the result is they run their plant for 24 hours, then shut down, letting their fire cool down, and are getting better results than before.

The President—Mr. Gwynn, what have you to say upon this subject?

Mr. Gwynn—I do not known, Mr. President, that I can add anything to what has already been said. It is a well established fact that all gas companies should have ample holder capacity, but they should not go to extremes. They should have ample holder capacity for the ordinary output.

Mr. Persons—I think the only relief of the small holder capacity is in a water gas plant.

The President announced a vote of thanks to Mr. McCormack, and then introduced Mr. A. F. Nash, of Windsor, Ont., who read his paper on

## CHANGING THE ARRANGEMENT OF A RETORT HOUSE, AND THE PRACTICAL BENEFITS DERIVED THEREFROM.

(For Mr. Nash's paper, see JOURNAL, March 25, p. 408.)

### *Discussion.*

The President—Gentlemen, you have listened to a very excellent paper, and I hope you will discuss it thoroughly. I will call on Mr. Faux.

Mr. Faux—I would prefer to hear from those who have had more experience in the matter than I.

The President—I will call upon Mr. Dell.

Mr. Dell—I would rather not make any comments on this subject, as I am not a practical manufacturer of gas.

The President—Mr. Holmes?

Mr. Holmes—Although I am very much interested in this subject, I would rather listen to others, with the view of putting the information I get into practice, if impressed sufficiently of its advisability. We could derive a great deal of benefit if those gentlemen who have had experience would tell us what they know about it. I have been buttonholing everybody who had any experience, with a view of getting their impressions, and I think there is some hesitation about telling anything that is not favorable. Men who manufacture this apparatus are here, and we do not want to invoke their displeasure; but I believe we all want to have a full and free expression on these important subjects, and I would be glad to hear the subject discussed.

Mr. Penn—I think Mr. Nash has covered the ground pretty thoroughly, and his experience is similar to ours. I think there is undoubtedly in the regenerative furnace a great saving of fuel. It is a very important question, especially when you get a good price for your coke. I do not know that there is so very much difference in the yield. I think we are more careful now in weighing our coal than we were when we used the old setting, but I cannot give the exact data or figures in regard to that yield before putting in the new setting. I am very much taken with the regenerative furnace, and would recommend it.

Mr. Cowdery—Our experience is that we certainly made a very desirable change when we changed furnaces. The old free fires gave us very poor results as long as they were in use. I never saw good results from them. We have had what we call very good results from the regenerative furnaces—not perhaps as high as some we have heard reported here, but we call them very good. Our percentage of coke runs anywhere from 16 to 25.

Mr. Gwynn—What kind of coal do you use?

Mr. Cowdery—Youghiogheny coal.

Mr. Gwynn—I do not think there is any question but that the half-depth and full-depth regenerative furnaces have an advantage over the common settings. At our plant in Steubenville we have the ordinary bridge wall settings; the retorts are 14 in by 26 in. by 9 ft. long. The yield per mouthpiece is 8,300 feet per day of 24 hours, so you can see that it is very nearly as good as a half-depth. The coke used for carbonizing in the bench referred to is 33 per cent. The bench runs at a disadvantage as the arch adjoining is empty. The results obtained depend on the manner of constructing the arches and the setting, and care of the retorts.

Mr. McIlhenny—I have no direct experience in this matter, but I realize that the subject is one of very great importance to gas companies.

Mr. Butterworth—I want to congratulate Mr. Gwynn upon the good results he has had from direct fire furnaces. He must have better Ohio coal than we are getting. I would say that at Columbus half of our furnaces are equipped with full-depth regenerative, and the balance, half-depth regenerative; and I can really see no very great difference between the two in efficiency. We get just as good results from the half depth as from the full-depth; but the labor item is larger.

Mr. Coombs—I have nothing to say about regenerative furnaces. I have had no chance to have any experience with them, but I have had a good many years' experience with what we call free fire open settings. We obtained the same results as Mr. Nash has spoken of—about 5,000 feet per mouthpiece—for a number of years. It may be that there are other gentlemen in the room who have had experience equal to Mr. Gwynn's, and if there are I would like to hear from them. His experience is exceptional, and probably true.

Mr. Gwynn—A great deal of the trouble experienced in the common settings is from the crude manner of construction and the light arches formerly used. The carbonization must take place in from 3 to 3½ hours in order to get good results. If you will construct good, heavy arches, and will take proper care of them when under fire, you will get nearly as good results from a common setting as from a half-depth regenerative furnace.

Mr. Bredel—It depends upon how heavy you make your furnace walls.

Mr. Gwynn—The outside walls or covering of arch referred to is 27 inches thick. The top of arch is covered with a 4-inch layer of asbestos fiber, and the front walls of benches are 11 inches thick, being laid with a 2-inch space between the courses which is filled with asbestos fiber.

Mr. Bredel—You ought not to use the asbestos fiber.

Mr. Gwynn—Asbestos is fireproof, and is a non-conductor.

Mr. Bredel—It is not; I beg your pardon.

Mr. Gwynn—Why do they cover steam pipes with it and use it as a non-conductor for various purposes?

Mr. Bredel—You try asbestos or paper covering, or wool or silk, and you will learn that wool or silk or paper will hold a very great deal more heat than will asbestos. Asbestos is fireproof, which is the reason it is used. Of course, in high pressure steam, paper is liable to burn, and lots of people get the idea that because asbestos is fireproof it is a non-conductor. It is a great mistake.

Mr. Gwynn—Why is it you can stand on the top of a bench in which a layer of asbestos fiber is used without discomfort, while the top of the bench adjoining is intolerable?

Mr. Bredel—Because of the difference in the thickness of covering.

Mr. Gwynn—But the thickness of the covering is the same, only asbestos fiber is used over one arch and not over the other.

Mr. Bredel—If you put in 4 inches extra fireproof or soft red brick, you will get better results.

Mr. Gwynn—One arch has the same covering as to thickness as the other. There is no difference in this respect. They are filled in with soft, red brick.

Mr. Bredel—I don't know about that. I know what the heat conducting possibility of asbestos is, and also what the heat conducting possi-

bility of firebrick is. If you want to put in anything to keep your heat, I think ashes will give you better results.

Mr. Gwynn—You are speaking of asbestos from theory. Did you ever fill a bench or wall with it?

Mr. Bredel—Asbestos? No. I have a cheaper material.

Mr. Gwynn—I am speaking from experience and you from theory. I am speaking from experience as far as asbestos covering goes. I have used it in pipe covering and exposed it to high heat, and it is good. (Laughter.)

A Member—Mr. Bredel, you will find out that steam pipes are mostly covered with asbestos.

Mr. Bredel—Very little is covered with asbestos; generally only the first layer, on account of fear of burning. If you use paper it is liable to ignite. Asbestos won't burn. Any handbook will tell you the conducting power of asbestos, and also of firebrick and paper, and you will see the difference. We have seen it from actual experience; not for one day, but for a long time.

A Member—I think if you have a little experience with asbestos covering for pipes, you will find it is very economical, and if it is not, there are a great many people in this country making errors.

Mr. Bredel—On account of being fireproof; but not on account of being a non-conductor.

Mr. Douglas—It just occurred to me during this last discussion that perhaps Mr. Gwynn's results are due to the fact that, in putting in this asbestos fiber, he had more or less air space. I think, as Mr. Bredel says, experience proves that asbestos is not a non-conductor.

Mr. Clapp—I would suggest if Mr. Gwynn were to use the regenerative furnaces and take the same precaution that he speaks of in the construction of the arches, he would get a proportionate increase in results. I think Mr. Bredel will agree with me in that.

Mr. Gwynn—That is right; you will increase the results, in taking care of your heat.

Mr. Butterworth—When you get a yield of 5 feet to the pound, what temperature do you have at the station meter?

Mr. Gwynn—The temperature in the meter room, which is off about 160 feet from the retort house, will run about 65°; in cold weather it is not over 55°.

The President—Mr. Printz, can you give us some of your experience in half-depth regenerative furnaces as compared with the open fire benches? That is the question which Mr. Gwynn and Mr. Bredel are discussing.

Mr. Printz—During the last winter we were running two benches old style fire, and three with the half-depth regenerative, and my experience is very much in favor of using the regenerative furnaces. We do the work much easier, with less fuel; and, of course, we had better heat. I do not know that I can say anything more. We do not clinker.

Mr. Coombs—I would like to ask Mr. Printz as to the comparative results he obtained with his open fires and the half-depth—*i. e.*, with reference to the value per mouthpiece, and the amount or percentage of coke that he used in the half-depth, and the percentage that he used in the open fire.

Mr. Printz—As near as I can get at it, with our free fires we were using 40 to 45 per cent. of coke; with the regenerative, about 25 per cent. We were coking more coal per mouthpiece in the regenerative furnace and doing it in *less time*. In the old style furnaces we were charging every 5 hours; with the regenerative we ran 4½ hours.

Mr. Hayward—I have been somewhat disappointed. I consider Mr. Faux a very progressive man. He has been making coal gas from coal slack for some time, and as he has a record in print for the last month's work, I was very much in hopes he would give us some information on it. Thirty-three per cent. of fuel and 40 to 45 per cent. is "not in it" when he presents a printed record of 10 and 10.31 per cent. If we urge Mr. Faux I think perhaps we could get some information on this subject.

Mr. Faux—Mr. President, we are still in the experimental stage in this matter to a certain extent. We expect to have this thing practically worked out before the meeting of the Western Association, and a paper prepared fully on that subject. This is the reason I am very loath to say anything about it now.

Mr. Jenkins—One of the questions we have to decide to-day is whether we shall take a half-depth or full-depth furnace, especially for works of moderate size. My experience has been that for works that produce near 50,000,000 feet a year, the half-depth furnace is the best, and you can get in the full-depth furnace afterwards. My reasons for that are these: First, half-depth furnaces cost less than full-depth; and, in the second place, you can manage better about your retort house.

The President—Donald McDonald, of Louisville, can perhaps give us some information.

Mr. McDonald—If there is one thing on earth I don't know anything about it is a retort. I stood on the outside and saw fellows fire them.

Mr. Nash—I would like to say one thing with reference to Mr. Gwynn's remarks. I think he must have a modern constructed arch, and that he has taken special pains to have his arch retain all the heat. Of course, my comparison is upon the per cent. ordinarily reached. How heavy was the outside wall, Mr. Gwynn?

Mr. Gwynn—Twenty-seven inches. The front wall would be 11 inches, but filled with 2 inches of asbestos fiber.

Mr. Nash—The wall on the outside is built as heavy as built to-day on regenerative furnaces?

Mr. Gwynn—Oh, yes.

Mr. Nash—Of course the idea of regenerative furnace practice is to preserve all the heat, and in the benches we are using now there is hardly any color. In the lowest horizontal flue it is probably cherry-red, and with the free-fire bench there is necessarily a good deal of heat going out through the top flue.

Mr. Gwynn—We find the stack a dark red at the damper in our free fires.

Mr. Holmes—I understand Mr. Printz to say that he does not clinker at all, and I feel that there is quite a margin between the statements in regard to the different furnaces. I would like to know if I understand correctly.

Mr. Printz—Well, when I say we do not clinker at all, I mean in the sense that Mr. Nash speaks of; we never remove the bars from the furnace. Our man, about four times in a watch, uses a tool we call the "sword" to draw them to the front, and then with a rake he draws out what little clinkers there are. As to allowing the fire to drop clear down or run in supplementary bars, we never do it. And we will run this way 8 months at a time without ever allowing the bars cleared of fire. I have a good many people look at me and say, "I don't believe it."

Mr. Bredel—I heard the same statement once in a convention about only clinkering every three days. I asked the man what he meant, and he replied, "Taking out the fire." The question is, What do you call clinkering?

Mr. Printz—Just merely shaking up. I think if you were to do that shaking up or drawing the fire you would find considerable difference in the work.

Mr. Bredel—I do not see why you remove your bars at all if you do not want to. Now, there are lots of benches where the removing of the bars has to be done every three or four days, which takes a great deal less time than possibly cleaning them up, or shaking them up, or whatever you might call it, four times in the 12 hours.

Mr. Printz—This does not take over two minutes to a bench.

Mr. Bredel—It takes a man about two or three minutes to get ready, two minutes to shake up, and three or four minutes to get his tools back again; but lots of people do not take that into consideration. It is not a question of how long the actual work has taken, but how long it takes from the time you commence preparation to do that work until you are done.

On motion of Mr. Hayward a vote of thanks was presented to Mr. Nash for his excellent paper.

The President—The first paper after dinner will be No. 9 upon the programme in place of No. 3, "Soft-Coal Water Gas," by Mr. W. S. Bowen. We have a pleasant surprise for you to-morrow—a paper on "Carbide of Calcium" will be read. In fact, we will have two papers upon that subject. Mr. Goodwin will have a paper, and he also has some of the material. He will exhibit this new luminant, and also the light. The paper will be read the second in the morning. I desire, on behalf of Mr. Backus, to invite the members to visit his exhibit at the Pan Handle Station, where he has a car fitted up with the Backus heaters.

The Secretary—I would say before adjournment that the Springfield Gas Company has very generously donated tickets to the theater this evening, and gentlemen present can procure these of me upon application. After the theater you are invited to a lunch, which will be partaken of by all our friends.

The President—If there is no further business, we now stand adjourned until 2 o'clock, P.M., sharp.

### First Day—Afternoon Session.

Order was called at 2:30 o'clock, President Cline in the Chair.

The President announced that Mr. W. S. Bowen, of Phila., Pa., would read his paper on

## SOFT COAL WATER GAS.

(For Mr. Bowen's paper, see JOURNAL, April 1, p. 446.)

*Discussion.*

The President—Gentlemen, you have just listened to a very interesting, well written and timely paper, which I hope you will discuss fully.

Mr. Higgins—I notice that Mr. Bowen, in his results, states that he use 2½ gallons of oil. I would like to inquire what gravity of oil was used at that time?

Mr. Bowen—I do not know that I can state the gravity; but perhaps Mr. McDonald can.

Mr. McDonald—If Mr. Higgins knows what the gravity of three cars of crude oil mixed with two cars of naphtha is, he will know the gravity of the oil used.

Mr. Nash—I could not help but think, when this paper was being read, that it should have been read with the paper on holder capacity. It is evidently a very good thing to have if the holder capacity is limi ed.

Mr. Gwynn—It would take better in putting in a new plant.

The President—I will call upon Mr. Faux.

Mr. Faux—Mr. President, I could not give you any information whatever on water gas, as I have never made a foot of it.

Mr. Butterworth—Is there a plant like this in operation anywhere in connection with natural gas?

Mr. Bowen—Yes, sir.

Mr. Butterworth—Where?

Mr. Bowen—Elkhart, Ind., and one in Pennsylvania. The machines are not built exactly alike, but are the same in principle.

Mr. Douglas—I would like to ask Mr. Bowen what amount of coal is used per 1,000 feet for steam purposes?

Mr. Bowen—About 10 pounds.

Mr. Bredel—I think it would be a great deal cheaper to throw the gas away and make tar and ammonia.

Mr. Bowen—A certain amount of coal gas has to be made in this country, and it is not a question of which can be made cheaper, but how much the country can stand of water gas and how much it can stand of coal gas, to keep up the price.

Mr. Faux—I think the tar and ammonia question will be settled by the coke ovens.

Mr. Bredel—I wish to state that this thing is all right in a certain way, but you cannot sell in this country 25 per cent. of the total amount of furnace coke produced from coke ovens. Of course, the blast furnace men and the cupola furnace men cannot use it. The same has been found to be true in Europe. They have made the statement that a great deal of ammonia can be saved, which is a fact; but if you commence manufacturing a lot of coke, what are you going to do with it if you don't have a market for it?

Mr. Faux—The largest manufacturers in this country have gone into it and tried it; but the reason it was abandoned was not on account of the fault of the coke oven, but that they did not have men to handle it. A certain amount can be made and will be made. We have practically demonstrated that from 10 to 14 per cent. more coke can be obtained than by the beehive oven process, and is fully equal to the best beehive oven coke for blast furnace purposes. This is made from the same sort of coal used in the beehive oven process.

The President—I will call on Mr. Collins.

Mr. Collins—Mr. President, I have not read the paper, nor have I heard it read. I just came into the room a moment ago.

Mr. McDonald—I have listened to Mr. Bowen's paper with the greatest interest, especially as I was present while he was getting the notes for most of it. I do not wish to deny any of his statements, and yet I do not wish to indorse them all. In other words, he has given exact amounts where the amounts are necessarily approximate. There is no regular station meter at our works at Louisville, and we are obliged to take the amount of gas given out as agreeing with the regulated holder. It must be remembered, too, that the plant was sometimes run for three weeks at a time, and not a foot of gas made. Other days it would be fixed up ready to make gas, and when the time came we found we had enough natural gas, and did not make any, which would make the consumption of fuel larger than it otherwise would be. I do not believe any of the results that have been given are lower than can be reached by a machine of that character. I believe the work can be done, but I would not be able to say that we did as well at our works last winter. The question has been asked me, "If gas is to be sold as a fuel gas, what is the use of enriching it to 20 candles?" The fuel gas has to be a first rate gas. You have to enrich your artificial gas to a high percentage, up to the natural gas, because if it is to be mixed with the natural gas and burned by the same burners and is not enriched, the fires will go out.

The President—Do you desire to discuss the subject any further?

Mr. Nash—I would like to ask Mr. Bowen about how many days the plant was run for gas making.

Mr. Bowen—About 40 days.

Mr. Nash—And I understand Mr. McDonald to say it was kept ready to run many times when it was not used.

Mr. Bowen—Oh, yes; it was hot from the time we started (I think the day after Christmas) until a few days ago.

Mr. McDonald—It was hot enough during 110 days to have been fired up on four hours' notice at any time, and, of course, steam was up all that time to avoid freezing. That took a good deal of fuel.

Mr. Collins—I did not hear this paper read, and I would like to know if there are any places where this process is in use, and if so, what are the results obtained, and if they are simply estimates.

Mr. Bowen—At West Chester, Pa., they have used a station meter—I am not positive whether or not there is a station meter at Elkhart, Ind. A comparison of the total amount of gas used there came very close to showing that, if there is any loss whatever, it can be accounted for by the amount of leakage; the whole amount of gas made compared with the whole amount of gas sold.

Mr. Collins—Still, it is largely estimated.

Mr. Bowen—At Elkhart there is a graduated scale on the holder. Their plant is not near as large as the one at Louisville. It is easy to get at the amount of gas made, because of the intermittent runs, but I would not say it is absolutely correct.

Mr. Jenkins—I would like to ask why they do not use the station meter.

Mr. Bowen—Because they do not have one. There was another water gas process there before ours was erected, and I think when that was started the station meter was abandoned.

Mr. Whysall—The holder capacity being very small in proportion to the amount sent out, the temperature must have been quite high.

Mr. Bowen—No, sir; we did not put the thermometer in the holder, but it was not warm enough to melt the snow, which would stay on the holder while we were making gas.

On motion of the Secretary a vote of thanks was tendered Mr. Bowen for his excellent paper.

The President—The next paper to be read will be that by Mr. John D. McIlhenny, of Philadelphia, Pa., on

## PREPAYMENT GAS METERS.

(For this paper see JOURNAL, March 25, p. 409.)

*Discussion.*

The President—Gentlemen, we have listened to a very excellent paper on a very important subject. I hope it will be thoroughly discussed.

The Secretary—On page 4 Mr. McIlhenny refers to the increase in Liverpool, and says that "before the introduction of prepayment meters 10½ per cent. of the population were consumers, and now there are 12.46 per cent." Is that increase known to be directly attributable to the use of these meters?

Mr. McIlhenny—It was so stated in an article on meters in the *Times*, of London. There was an article written giving far more in detail than I have given it, which stated that the increase was due entirely to the prepayment meters. It was also stated in that same paper that after the introduction of these meters the sale of coal oil fell off rapidly, showing that the people who had been using oil for lighting had ceased using it.

Mr. McDonald—Mr. McIlhenny has covered the ground as well as anybody could. Meter makers as a rule have endeavored to look the matter over carefully and to face it squarely, to get the best thing and place it on the market in such a shape as to make it convenient to use, and especially that it might be adapted to the American market. A great many English meters are not applicable to the American market. I think the endeavor of the meter men has been to make something to supply this market.

The Secretary—We have three of these prepayment meters in use in Columbus, and one case in particular I wish to speak of. A woman who was almost a constant growler in regard to the size of her bills allowed us to put one of these meters in for her. Her bills are fully as large now as they were previous to the introduction of the meter, and not one word of complaint has ever been heard from her since. I think the fact that she pays for the gas in small sums at a time has a very beneficial effect. It certainly helps us.

Mr. Holmes—I could not help thinking that perhaps some trouble might arise from the gas being cut off at various times. I know that gas manufacturers are very loath to have the gasholders go down and

cut off consumers. Another thought that occurred to me was that these meters, as I understand, cost nearly 100 per cent. more than the ordinary meter, and to put them in where you get the least consumption, as a rule, becomes a serious matter in a financial sense. I do not believe it pays us to put in meters where we get only 50 cents a month consumption of gas.

Mr. McIlhenny—Referring to the gas giving out in a house, most of the meters are arranged so that the lights will gradually lower. If only one light is burning, 15 or 20 minutes' notice would be given before it went out.

The Secretary—We had an experience of that kind. I put one of the meters into the house of a particular friend, and asked him to try it. One evening he noticed that the gas was gradually going down. He started to the telephone to call up the office, but as he afterwards said, "I thought the meter was dunning me, and a nickel put in it caused it to work all right."

Mr. Doherty—Hotel proprietors, I believe, expect a great deal from this source in England, and there is no reason why the same should not be the case in this country.

Mr. McIlhenny—That is something to which a great deal of attention is being given. To place a meter in each hotel bedroom would be a great expense. In Paris they have an arrangement in each room, and when a guest wishes heat and sends down to the clerk, the clerk sends up to the room to see what time is recorded, and when he wishes to discontinue the heating the clerk sends up again to take the time, and from that an estimate is made of the amount of gas used. It must be cheap and simple. Hotel people will not put a large investment in a meter in every room, but there are devices by which the same object can be accomplished.

Mr. Butterworth—I believe that large gas companies particularly would find it advantageous to keep a few prepayment meters of different sizes on hand to be placed where they can be used to advantage. I understand that 20-light prepayment meters are now being made. I can conceive that they could be used, for instance, where some person comes to town to sell out a stock of goods, a fire sale, and wants to occupy a store room for a few days and does not want to put up a deposit. The gas company could put in a 20-light meter and secure his patronage in that way.

Mr. McDonald—Large prepayment meters would cost the gas companies a little more money, but, of course, the cost of making a larger prepayment device would not be so expensive proportionately. The company would get more for the meter, thereby reducing the percentage of cost of the meter considerably.

Mr. Allen—The gentleman made the remark that smaller houses as consumers do not pay. With us, at least, that is a mistake. A great deal of gas is burned by small consumers, and I believe that the smaller houses will burn as much gas as the larger ones. It does look to me that in the matter of inducing those people who live in the smaller houses to use gas we will have to watch expenses. There is something in it. I believe it pays to look to it. I believe we will get more in our business in the way of looking to the smaller houses than to the large ones. Besides, there is a feeling that we people do not like "to pay for a dead horse," and the prepayment meter would induce many to use gas who do not do so now.

Mr. Gribbel—Prepayment meters have proven a success wherever they have been put into a neighborhood. The consumers go to the gas company and insist that they do not want the other kind. They want to pay for their gas as they use it. I have not heard of a single complaint from the gas men of the prepayment meter; on the contrary, I have heard nothing but expressions of approval. I have no doubt that the prepayment meter, as soon as it is generally known, will be largely and generally used, and by people who are not now gas consumers. An Eastern gas man told me, some two weeks ago, that he had replaced ordinary meters in several instances with the prepayment meters, and has found the gas consumed to amount to 100 per cent. more than the consumers previously used. I think that a very good argument in its favor.

The President—I will ask Mr. McIlhenny if there is any discrepancy between the deposit and the meter?

Mr. McIlhenny—There was not, I understand.

On motion of Mr. Butterworth, a vote of thanks was extended to Mr. McIlhenny for his excellent paper.

The President—As the next paper on the list (No. 5, on "Incandescent Burners") will not be read, owing to the illness of the gentleman (Mr. H. Wilkiemeyer, of Evansville, Ind.), who was to have prepared it, we thought it wise to here take that question up from the Question Box and discuss it. You will notice that questions 16, 17, 18 and 19 pertain to this subject. Question No. 16 is:

"What Progress has the Welsbach Mantle Made Within the Last Year?"

Can any gentleman give us any information on this subject? Mr. Brown, will you kindly give us what information you have on this subject?

Mr. Brown—I hardly think, Mr. President, while I would like to serve you in the cause of the Association, that the subject is one that I can add any light upon.

Mr. Gwynn—I understand the question is, "What Improvements Have Been Made in the Construction of the Mantle?" From my knowledge, I would like to say that the construction of the mantle is not as good as it was a year ago, and it is not as good as the mantle made last fall. In the rush of business they have put out a great many poor mantles.

The President—As Mr. Stephens, of the Welsbach Company, has just entered the room, I will ask him if he can give us any information on the subject embraced by Question No. 16?

Mr. Stephens—I do not know that I can enlighten the members on the progress of the Welsbach light, more than to say that perhaps a majority of the members here who have handled the Welsbach lights during the past year, have experienced a little trouble in getting enough lights. The greatest difficulty I had to contend with during 1894, from the 1st of September to the present time, has been in explaining why I did not get orders filled. Go back to '90 and '91 and you will all recollect the experience of the gas men with the Welsbach light, on our No. 20, as shown at that time. It practically went out of the market. Since we have brought out our new No. 20 lamp and 169 mantle, we have never been equal to the demand. I would say, however, for the encouragement of those who are handling them, that we are or will be in a position, I think I can safely say, to meet all demands the coming fall. I do not think the light needs any of the Welsbach people to talk about it. It is as well known among gas men as by ourselves, and they know its virtues. The business men of the country during the last year have all learned the value of it, and I do not think it is necessary, or that I could say anything that would enlighten any member present in regard to it.

The President—The question is, "What progress has the Welsbach mantle made within the last year?" Have you made any improvement in the mantle?

Mr. Stephens—We have made no particular improvement so far as the candle power is concerned. As far as the mantle is concerned, you all know that it is better and stronger than it was last year.

Mr. Gwynn—How has it been in the past six months?

Mr. Stephens—I would like to ask Mr. Gwynn how long he has handled the mantle.

Mr. Gwynn—Since last October. Has any improvement been made on it since that time?

Mr. Stephens—I do not know that it has been improved since October.

Mr. Gwynn—Do you think it is as good as it was last October, and as carefully made?

Mr. Stephens—I do. The same care is taken with the mantle right along.

Mr. Gwynn—Are you not having more complaints than you had before from breakage of mantles?

Mr. Stephens—As I said before, the greatest complaint is on account of quantity.

Mr. Gwynn—The quantity, I am well aware, is short; but what is the quality?

Mr. Stephens—The quality is up to our mark. I believe that when the mantle was first brought out, a little over a year ago, it was more fragile. That is my opinion. We cannot make a better mantle than we are making. Since I came here several people have told me that they have been burning these the last 6 or 8 months, and I think that ought to be proof enough of the value of the mantle.

Mr. Gwynn—The mantle put out last year, when the factory was not busy, was very good, but many shipped since the factory was busy have been short-lived, and there has been a great deal of trouble with them.

Mr. Stephens—Mr. Chairman, the idea may have gotten out, because we were busy, in fact overrun, that we were playing the same game that other manufacturers would—shipping goods that were not good. (I ask pardon from the meter men.) In our line this could not be done, for the reason that you cannot hurry a chemical preparation. It has to take its course, and even if all the gas men in the country were waiting for lights, we could not hurry a mantle two hours. So, as far

as we are concerned, one mantle would be as good as another. As for the breaking of mantles, the Welsbach people are not responsible. We take a dozen mantles, examine them and find them perfect. We ship them, and if those mantles are handled roughly in transportation, or the box should be dropped, the vibration would spring them more or less in the box. Take it out of the box and burn it a while, and where that spring was it will probably open up just the same as if cut with a knife. We are not responsible for this. The railroad companies have promised us that if we would get out a label, "Handle with care," they would see that our boxes were handled with care. That is the best we can do. We sometimes have complaints where goods have been broken just through carelessness. Otherwise I believe the majority of people get their goods in good shape.

Mr. Butterworth—Mr. Stephens, what improvement, if any was necessary, have you made in regard to the color of the light? Some people have imagined that it gives a greenish light.

Mr. Stephens—You will observe when the light is turned down it does give somewhat of a reddish cast, but the light was never green. There is nothing in the chemical to make it green. We are not accountable for persons who are color blind.

Mr. Doherty—Just before I came away from home an electric light man said to me, "I don't like that light, it looks ghastly." I said, "Yes, I guess it does, to you." (Laughter.)

The President—Questions 18 and 19 might be taken up at this time, and we could get some information from Mr. Stephens. Question No. 18 is:

> "What percentage of saving in the destruction of mantles is effected by using the self-lighter?"

And Question No. 19 is:

> "How much gas is used by self-lighting attachments while idle, say, 18 hours out of the 24?"

Mr. Butterworth—In reply to Question No. 19, Mr. Wallbridge wrote me that the consumption of the self-lighters of the ordinary "Matchless" self-lighting type would be about 225 feet per month. I made some tests at Columbus, and found that, with a 1-inch pressure, the self-lighter consumed $\frac{3}{10}$ of a cubic foot per hour, and with the average pressure it would consume about 4½ feet for 18 hours, which, for one month, would amount to about 243 feet—in Columbus, about 24 cents worth of gas. I think there is nothing more satisfactory in connection with the Welsbach burner than the satisfactory, economical self-lighting arrangement.

Mr. Stephens—I think Mr. Butterworth has covered this point pretty thoroughly. One thing in particular is the relighting of lamps. I believe it is a great saving in some instances in chimneys. The great majority of people, in using a light, no matter what the temperature of the weather is, will throw the light on immediately, and the next thing the chimney is broken. Of course, the mantle will heat up somewhat, and that prevents all breakage of that description.

The President—Question No. 17 is:

> "Is not the benefit gained by the displacement of incandescent electric burners by the Welsbach lost in the reduced consumption of its original lines, when ordinary open tips are used?"

Mr. Allen, will you give us some information upon that subject?

Mr. Allen—I could not give you any information upon the subject, Mr. President, but I do think, as a matter of principle, it does not make any difference when we think about our competition, and we can set it down that our greatest competition is coal oil. It looks as though the cheaper the gas companies can furnish light to consumers, the more gas they will sell in the way of having an increased consumption. Suppose it does give gas companies a temporary backset. They will get into better shape afterwards. They will be able to furnish light to their patrons for less money, and work into the graces of the people better than in any other way. I think the best thing gas companies can do is to get the very best appliances for furnishing light.

Mr. Butterworth—Personally I have unbounded faith in the wisdom of the promotion of the Welsbach burner where it can be satisfactorily used. I think that it is the proper policy for gas companies to pursue.

Mr. Allen—I am very much interested in the Welsbach burners. As Mr. Gwynn said, the first lot that came to us gave first rate satisfaction, the second lot of mantles was not good as a rule, and Mr. Stephens says the mantles were injured in transportation. I hope so, and that we won't have any more trouble with them.

Mr. Stephens—I would like to hear from our Springfield agent, if he is present. I do not know to-day any more than you do what the conditions are in Springfield, and the reason I ask is I do not know how our mantles are lasting here. For that reason, and this being one of the first places west of the mountains where they were introduced, I would like to hear the conditions in Springfield.

The President—Is Mr. Olds present?

Mr. Olds—My experience has been that we have very little trouble in the breakage of mantles. We have about 2,000 lights in use, and are using about 100 mantles per month. We think that is a very small percentage of breakage. With regard to shipping we have some trouble, but we think we have been very fortunate.

Mr. Nash—I have not very much to say, except that I think it works out about one-fourth of the cost of electric light—incandescent electric light. Our consumers who have tried it find that their experience.

Mr. Boyle—I have not much to say except in favor of the Welsbach lamp. In our little town of 7,000 inhabitants we have put out 498 Welsbach lamps; of that number 284 have taken the place of electric light, 36 of oil lamps, and 169 of ordinary tips. Now, in "ordinary tips" is included quite a number of house lamps, so that the proportion would run up to, I presume, about 330 to 350 out of the 489. We have had some trouble. The first mantles we got were very good; some of them have lasted over a year and a half—they were very well taken care of, however. Then we were careful in lighting them and careful to only turn on a small quantity of gas so that the explosion was as slight as possible. I think Mr. Gwynn's trouble has been from his high candle power gas, rather than from poor mantles.

Mr. Gwynn—Our way of lighting the Welsbach burner has been just the reverse of the instructions given by the Company. Turn the gas on full, then strike a match, lighting the burner at the top of chimney, and you will have less explosions than if you only turn on a small quantity of gas and have the match in readiness at top of chimney. You will find very soon open and porous places in the mantles, and they are sometimes split down the sides. The defects are in the knitting of the mantles. The mantles manufactured for the last few months have been quite poor, while the mantles last fall were the best ever used; never heard a complaint from anybody about them. I do not think it is in the chemicals at all.

Mr. Welch—I have had no experience with either the Welsbach or incandescent electric light, but on this question I am a pronounced advocate of whatever will decrease the consumers' bill, whether it be the Welsbach light or any other light.

Mr. Douglas—I went over our books this month on this question, to see whether we were gaining or losing business with them. I just went through the business houses. We had put Welsbach lights into 45 business places, and out of the 45, 31 were using something else formerly. It was decidedly in our favor, for we had apparently made considerable gains.

Mr. Brown—I would like to ask Mr. Gwynn how it would be possible, as these samples are knit in the machines, to have defects in the knitting?

Mr. Gwynn—Let me ask you, Mr. Brown, how it comes that mantles are of different sizes? There are not two of them alike. It is evident there is a defect in the manufacture. They are all knit over the same form, yet they are not all of a size.

The President—It might be in the shrinkage of the material before it is dipped.

Mr. Stephens—As was said a while ago, the mantles are all knit on the machine; but they are not knit in one layer. It is cut off in lengths, and then a girl takes it, draws the cuts together and sews it. The cut is then put in and dipped, or, rather, passed through a chemical solution to purify the cotton. The cotton is made chemically pure. After it is dry it is taken into our laboratory, placed on a roller and left until it is dry; then it is taken down and passed into the girl's hands again, and under a strong blowpipe they burn the cotton out. Now, Mr. Gwynn's objection to the mantles not being all uniform is due to the fact that some shrink more than others. As far as the making of the mantles is concerned, every mantle is made as perfect as it can be made.

Mr. Gwynn—I can readily see where the trouble is, and find they are knit solid.

Mr. Stephens—The trouble is, just as I say, in the transportation.

Mr. Gwynn—It is due to the overwork of the plant, and inexperienced hands you have. There are a dozen or two other gentlemen in this house who have had just the same experience that I have had, but are afraid to say anything.

Mr. Lynn—My experience has been much the same as Mr. Gwynn's. It is not very likely that all this defect is due to shipment. It might be due to shipment to Mr. Gwynn, but when this complaint comes from all over the country, Mr. Stephens must admit that there is a chance for imperfect mantles. We have one mantle in particular in

our wash-room; there is no draught in there, as there is only one door. The first mantle we put on run for two or three months, and within the last two or three months I think we have renewed that mantle on an average once every two weeks, if not oftener. We first put the mantles on a year ago last November, and four of those mantles are there yet. The other mantles we put on lasted first rate, but the last assortment have been very imperfect. They do not crack straight up and down, but holes come in them. If you examine that mantle closely you will find the solution is heavier on one side of it than on the other. The mantles are not perfect.

Mr. Brown—During the early fall I made up my mind, as my eyes were hurting me, that the only satisfactory light I could get would be the Welsbach, so I sent to the home office in New York, and they brought me down a very nice light, and I said I would keep a tally on this light, the number of hours burning, and I will make a record for my own satisfaction. I observed the light very carefully and readjusted it from time to time. About three weeks ago I had a book in my hand, was reading, when a gentleman came in, and I threw my book over on the table and it merely struck the shade of the lamp. I immediately arose and looked over at my light and found a small puncture which I am satisfied had not been there before, and I said to the gentleman, "That light jar which occurred caused this puncture," and I lighted it to see what the result would be from the accident that occurred, and in a few minutes my chimney was gone. Now that puncture was not through the deposit of fluid more on one side of the mantle than on the other, but it was the result of a jar, and I think very likely the lamps which Mr. Gwynn mentions may have been in some places where they were open to such an occurrence. Now I say to you very briefly that the mantles being dipped, and then put through—I can best explain it by saying a wringer—I do not see how there can be a deposit or a preponderance of the fluid on one side more than on another.

Mr. Lynn—Mr. Brown says that these mantles are dipped in this solution and must be uniform. Dip a rag in a solution of salt water and the brine will not adhere to it uniformly all over. This is the principle on which these mantles are made. You do not get a uniform thickness all over it. You get it as near uniform as possible, but I do not think it is absolutely perfect.

Mr. Brown—I do not know the thickness of the threads, but the Welsbach mantle is quite a different substance, and its reception of the fluid is quite different from a rag dipped into salt water. The surface is quite different.

Mr. Stephens—I would like to ask the gentleman if, in dipping a piece of netting into a pail of water, he is going to load it more with water on one side than on the other?

Mr. Lynn—I do not say I load it more on one side than on the other, but I may load it more on one end than on the other. It may draw one side of the netting more than it does the other.

Mr. Jenkins—I have never had a very poor batch of mantles, although I had a number that gave out very soon after they were put in; but before I made complaint I commenced to investigate, and decided to have one party do that work. I gave him explicit instructions as to how to put the mantle on, and I am frank enough to say I believe the mantles are better than they were before. I did have a good deal of trouble with 100 mantles, but now they come right along without any trouble at all. This party is an expert with mantles, and when he puts on a mantle it stays. I think the answer to Question No. 17 would depend largely on circumstances.

Mr. McIlhenny—I think an important feature is to have them vertical. Frequently the chandelier may be out of line, and if it is out of line the mantle will not be equally distant from the chimney, hence a part of the chimney would be heated greater than another part, causing the chimney to break. It is likely the majority of the breakage results from the chimneys not being put on carefully. I take a good deal of interest in a small gas company along the Atlantic coast, and we there have pushed the Welsbach light as much as possible; in fact we have sold there a little more than two Welsbach lights to every consumer—a result, I believe, that has not been exceeded by any other place I have heard of. Of course every consumer has not two Welsbach lights. We have done a good deal of business there, and the consumers remain with us and are better satisfied, and we feel that it has been a very valuable friend to us.

Mr. Brown—I think, Mr. Jenkins, I have seen a statement made by you about a couple of mantles that went through some fires that occurred in your city during the past winter. Perhaps you will be kind enough to recite that experience?

Mr. Jenkins—Early last December we placed a Welsbach light in a jewelry store, and the next evening I called on the proprietor, who said to me: "I like the light first rate, but it uses too much gas." Electric light people can give a great deal of information in regard to the Welsbach light, the amount of gas it consumes, and the fact that the burners will not last. About a month after this burner was put in a fire occurred in the back part of the store. The fire department put on the water until they had simply flooded everything—jewelry store, Welsbach burner and all. The next morning my young man, who had put in the burner, went around and found it all right. About a month ago we had a very serious fire—a wholesale grocery store and candy factory were burned—and the smoke, steam and water came through to the front part. It was about 8 o'clock in the evening, and after the fire was practically out the young man said, "We won't be able to light those Welsbach lights any more." They were as black as your hat. I said, "Go in and light them." He did so, and they are running to day.

Mr. Gwynn—There is no doubt in my mind but that with proper adjustment they are superior to any incandescent gas burner in use. When the mantles are properly constructed and the lights properly adjusted they will give general satisfaction. If they are not properly adjusted, as I said before, they are no good and will be short lived. We are pleased with the lights but not with the poor mantles we have been getting for the past four months.

Mr. Stephens—As far as that is concerned I do not think it is worth while discussing, because the same opinion would be held by these members. However, I want to say one thing to all of these gas men who are handling our light: I visited a place a short time ago and the agent said to me, "Your mantles are not good." I said, "What is the matter with them?" He replied, "They broke after they had been on two or three days; that one only lasted a week." He showed me some of the mantles, and allowed me to put one up. I asked him how often they had been changing mantles, and he said about every week. I said, "That should not occur." But he said, "That is the way they have been putting them on here." I examined them and read the meter to ascertain the amount of gas that first went in. The pressure was, if I recollect right, about 17-tenths, and the consumption was about 3½ cubic feet: More gas passed into that mantle than it could contain, and it was only a question of a short time that that gas would force its way out or break down the mantle, and the Welsbach Company get the blame for it. I say this merely for your benefit, and not to find fault. The mantle can only contain enough gas to make a perfect light. The trouble comes from the gas you put into that mantle. If it is more than it can contain, it has to go some place, and it is only a question of a short time when it will force its way out and destroy your burner. A gas man will send in an order for lights for 5-tenths pressure. We send them. There is not a town in Ohio that carries 15, or 17, or 20, or 22-tenths that has that pressure all over town. The pressure varies. I find the difficulty is not so much in the mantle as it was in the handling of the mantle.

Mr. Hayward—I would like to ask Mr. Stephens what is the best pressure for the burner.

Mr. Stephens—I do not know that that makes much difference; anywhere from 12 to 20 tenths. We can regulate the pressure to any of those. The regular pressure runs about 15 tenths. We then set our burner to use about 2.8 feet of gas, and whenever you put on 3.5 feet you have more gas than the mantle can take up.

Mr. Gwynn—The burner must be adjusted to use under 3 feet of gas per hour or the mantle will soon be destroyed. It is best to adjust the burner at the place it is to be used in the evening, after the night pressure is on, and by so doing you are sure that the mantle will not be destroyed from too great a gas supply.

Mr. Stephens—According to the amount of pressure. I do not wish you to understand that I am finding fault with you, for I am giving these facts for the benefit of the gas men in general. Brother Gwynn understands the light, as he says, and can adjust it properly. I do not wish to dispute this, but I want to give the facts to those who cannot. If the gas men will have someone thoroughly familiarize himself with the mantle, the construction of the lamp, how it should be handled and how much it will contain, the best results will be obtained. Let that man handle the lights, and I will guarantee that two-thirds of the complaints will be taken away.

Mr. Doherty—I would like to ask Mr. Stephens what variations the lamp will stand, and what is the lowest pressure in which you can have a perfect mixture.

Mr. Stephens—I have made a little experiment on 8-tenths.

Mr. Doherty—Won't it go below that?

Mr. Stephens—Yes, you could go below that; but I do not know that I have done so. They have made light on 5-tenths, but I was speaking for myself. The variation should not be over 3 or 4-tenths.

Mr. McIlhenny—One of the members spoke of the electric light convention at Cleveland, which reminds me of seeing a copy of the proceedings of that convention when the subject of the Welsbach light was under discussion, and the remarks of one of the members may be of interest to the gas people. He said he had put in an incandescent electric light plant in a town two years ago, but if he had seen the Welsbach light before putting in the plant he would not put in an incandescent electric light plant in a town under 25,000 population, though in cities over that size there was ample room for a plant by itself; but under that, any company would have difficulty in competing with the Welsbach light. This, coming from an electric convention, I thought might be of interest to you.

Mr. Gwynn—The remarks Mr. McIlhenny refers to were made at Cleveland. The remarks I made favorable to the Welsbach light did not appear in print, as they were too favorable, and would be detrimental to incandescent electric lighting.

### An Invitation.

The President—I think possibly the members are getting tired, but before we adjourn I want to say to you "the latch string is out" at the gas works, 2½ squares north of here on this street, and we would be glad to have you visit the works and see a model gas plant. I want to remind you again that the tickets to the entertainment this evening are here with the Secretary, and I hope you will avail yourselves of the privilege of attending. The meeting is adjourned until 9 o'clock Thursday morning.

### Second Day—Morning Session.

The President called the meeting to order at 10 o'clock, and announced that as Mr. C. V. Newman, of Peoria, Ills., was not present, his paper on

HINTS ON HANDLING GAS STOVES,

would be read by the Secretary.

(For Mr. Newman's paper, see Journal, April 1, page 448.)

Having finished reading the paper the Secretary said—The advertisements referred to are rather showy in their nature, and would attract a good deal of attention. I have them here if anyone wishes to see them.

### *Discussion.*

The President—Gentlemen, you have heard a paper that is of considerable interest to the gas producer. While it is not very long, some very excellent points have been made, and we ought to have a thorough discussion. We are very sorry that the author of the paper is not here to-day to answer questions that might be put to him with reference to introducing the gas stove, but we have with us a gentleman who will make a very excellent substitute. Mr. Cowdery, we would like to hear from you.

Mr. Cowdery—We began in Milwaukee four years ago last January making a special effort in introducing gas stoves and gas for fuel purposes. Previous to that time we had worked it up in a small way for two or three years. After going into the business, the price of gas was reduced from $1.20 to 80 cents for fuel purposes. The province of the Company was defined in this manner: that we should not sell stoves under any consideration, which task was to be left to the stove dealers of the city. This determination was brought about perhaps somewhat by objections being made in the neighborhood of the dealers, that the gas companies sell stoves and take their business away from them. We feel that it was well handled in that way. The first season we placed 1,660 stoves of various kinds; the second year we placed 2,900; the third year 2,550; last year it dropped down to 1,500. On the 1st of last January we had 7,000 consumers of gas for fuel; in other words, 7,000 fuel meters against 17,000 illuminating meters. The present fuel consumption runs something about 30 to 33 per cent. of the amount of sales. That shows our success in this line. Still, though the policy adopted by the Gas Company was good, it remains to be seen whether it was the best.

Mr. Allen—Mr. President, it seems to me that with us it is not a question now of introducing gas stoves, as the business is already introduced. We have about 2,000 meters in, and pretty near a gas stove for every meter; and we are after more meters. We will follow them up with gas stoves when they get the meters.

The President—Mr. Jones, you have had considerable experience in the direction of handling gas stoves, and we would be glad to hear from you.

Mr. Jones—We sell stoves at cost, or put them in free of charge and rent them. We rent a 4-burner stove for $3 a year, and get satisfactory results. We find that generally people would rather rent their stoves than buy them.

The Secretary—I would like to ask Mr. Jones if, after a stove is once rented and is brought back to the office, other parties object to taking it again? Don't they always demand a new stove?

Mr. Jones—We do not show them anything but second-hand stoves until those are all placed. In that way we get rid of all the stoves we have.

The President—I understand that Mr. Stacey, who is in the hallway, has had considerable experience in the introduction of gas stoves. Will he please step in and favor us?

Mr. Stacey—I know nothing at all about gas stoves. You have struck the wrong man. I would like to ask Mr. Jones what he finds the repair bills on the stoves amount to?

Mr. Jones—We figure about a dollar apiece.

Mr. Jenkins—I rather hoped something would be said in addition to, or besides cook stoves, for I think there is a great, big field outside of them. Last year in our town the question of selling them on the installment plan, according to the size of the range, was brought up. One gentleman a few minutes ago spoke about renting them by the year. This plan we are considering, and I would like to hear more about it. We have, within the last year, taken up the plan of renting stoves in another direction. In the fall we purchased a number of Backus heaters and put them out at rental, and our success in that line has been very good indeed. Along in November and December we put out Backus heaters which cost us, pipes, fittings, heaters and all, $450. We charged 10 per cent. on the list price for the year's rental. We got in advance on rental $59 for one year; in other words, a little over 13 per cent. paid in advance on our investment. Taking the two months that we have used these entirely, and pro rata it for the five months that we shall rent in the South, we will sell about $260 worth of gas. We get $1.25 per thousand for gas, and at the price that it costs us, will net about one-half profit. This shows an investment of $450, and a financial return for the year of $189, or nearly 42 per cent.

The President—In connection with this subject, we might read a question put in the Question Box recently, and discuss it along with the matter in hand. The question is: "Is there any perceptible odor from the use of the Backus heater on coal or water gas?"

Mr. Penn—I use Backus heaters in my residence, and I notice that when we keep water in the lower pan there is no odor whatever. I let the fire burn all night on cold nights, turning it very low so as not to be too warm, and I could not notice anything in the way of a bad odor. On the other hand, if you leave the water out of the pan there will be an odor just the same as from any other gas fire, especially where a mixture is used.

Mr. Gwynn—Did Mr. Penn experience any trouble from the sweating of walls in rooms in which the Backus heater was in use?

Mr. Penn—Yes, sir; that is the main objection we had to it. In cold weather when the rooms heated up, we could notice moisture run down the walls. If we lowered the windows more gas would be used.

Mr. Jenkins—I have no more trouble in that direction than you would have with a steam heater in your room. Parties raised that question about the Welsbach light, saying the show windows were covered with ice, and you could not see their goods displayed. I called their attention to the fact that other windows that did not have the Welsbach light, but that did have incandescent electric light, were just as thoroughly coated as those that had the Welsbach lights, proving that the moisture on the window was from other causes, and that it can be produced from other causes just as well.

Mr. Gwynn—I would like to ask Mr. Jenkins if, in the rooms he refers to, where the moisture was on the windows, they were not burning gas in open flames; and if the show windows were open?

Mr. Jenkins—There was, certainly, a communication between the windows and doorway. The point is just this: The moisture came from some other source than the lighting. They had incandescent lights all through the store.

Mr. Cowdery—I understood from one or two parties here that in using the Backus heaters you might put one or two in a house, and find no objection, but if you undertake to heat that house exclusively with Backus heaters, while you may find no objection for the first two months, you will then find that the house begins to get damp inside, and moisture will collect on the windows, and that you do find more or less odor.

Mr. McDonald—I never used a Backus heater, but I do have complaints from about 5,000 gas fires. If you take a brick house, not painted on the outside and not painted on the inside, you can burn gas fires with no flue connection and not be troubled with moisture on the windows, for the reason that the moisture goes through the walls. On the other hand, you take a brick house, painted on the outside, and you

will not hear of moisture for a year. Take a house painted on the inside and outside, heated entirely by gas fires, and no flue, and the water will run down the walls in streams in cold weather. In other words, it does not make any difference where on earth you burn that gas, provided you give it enough hydrogen to change the oxygen of the air into water. It does not make any difference how it is arranged. Oxygen combined with hydrogen at a high temperature will produce water. That water will appear in the products of the combustion of the gas, and if it is not carried up the flue it will condense on whatever it strikes that has a lower temperature. Now, if anybody will tell me why that should not condense on windows and walls, I am willing to back out of all I have said, and apologize for it. I want to say that the experiments of 1,000 men, if they differed directly with the well known principles of chemistry, would not upset the proof of chemistry in my mind, unless there came along an explanation of how it could be.

Mr. Jenkins—I called upon Mr. B. F. Archer some time ago, who told me that he had heated every room in his house, for two or three years, with Backus heaters, and that he was perfectly satisfied with it. He is President of the Camden (N. J.) Gas Company, and a gentleman that you all know. I am confident he did not misrepresent it to me in any form. His entire house is heated with the Backus heater, and he has no trouble from odor.

Mr. McDonald—A gentleman who heated a three-story house with open gas fires and no flues, said to me one day, "We have to do something to get rid of this moisture, or we will have to quit burning gas." I asked him, why? I said, "Your gas bill is not large. How do you burn your gas?" his gas bill did not run over $50 a year; and I questioned him as to the open fires and no flues. He had his flues stopped up as tight as asbestos and mortar would make them. He was putting into his house seven or eight gallons of water a day, and an equivalent amount of carbonic acid. I told him he would not get healthy in that kind of atmosphere; and that if he put that amount of water into his house he could not expect to have dry walls or dry windows. His gas bills have gone up about 50 per cent. I want to say to you, gentlemen, that if you allow your customers to burn gas under such circumstances, they get the idea that it causes diphtheria or typhoid fever, and it will take you five or ten years to get the idea out of their heads.

Mr. Nash—That was natural gas, I presume, Mr. McDonald?

Mr. McDonald—Yes, sir.

Mr. Nash—How does that differ from the other?

Mr. McDonald—The proportion of hydrocarbons is about the same. The hydrogen will turn to water and the carbon to carbonic acid, and as the air is robbed of its oxygen, the nitrogen is left for you to breathe.

Mr. Jenkins—Do all gas stoves do the same thing?

Mr. McDonald—If they give perfect combustion, they do practically the same thing. I am assuming that the burner used is sufficiently well constructed to give perfect combustion, that all the carbon shall turn to carbonic acid and that there shall be nothing left over.

The President—Is there a representative of the Backus heater present? We would be glad to hear from him.

Mr. McDonald—I want to be understood as not attacking the Backus heater.

Mr. Jenkins—Didn't I understand that you had a stove made to burn in a room without any flue at all?

Mr. McDonald—No, sir; I did not. On the contrary, I reported I had constructed a stove expressly for an experiment made by us to find out how it would compare in economy with the other kind. Mr. Jenkins' question seems to apply to me. My remarks are prompted by an amount of self-interest; but I want to say that the biggest liar in the world can tell the truth about chemistry and mathematics, and if it is not true you can find it out. On the contrary the most honest man can be mistaken about those things.

Mr. Jenkins—I saw an article from you in regard to a stove of that kind. I understood you constructed a stove of that kind.

Mr. Sloan—I am a representative of the Backus Company. I would like to say I did not hear the early part of this discussion, but I understand Mr. McDonald to say that there is no objection to the Backus heater on account of the odor. Of course, when the Backus heater is properly arranged, there is no odor more than from an ordinary stove. In regard to the moisture spoken of, it has been in some few cases a little troublesome. We have about 15,000 of these heaters now in use, and we sent out a circular letter to our customers in New York, Boston and Philadelphia, a short time ago, to which we got about 1,300 replies, and I have a large bundle here if you would like to look them over. They are almost unanimously commendatory—not a single complaint—but, on the cantrary, they say they never had or enjoyed such a perfect method of heating as they have since they introduced the Backus heater. Now, of course, it is impossible that these people should not be disinterested; and while Mr. McDonald is right in saying it is a terrible thing that the air should be deprived of its oxygen from the combustion of gas in a room, he says what is true, but he forgets the conditions. We are not living in hermetically sealed rooms, but the amount of air that is taken out comes into the room again. If you turn 20 per cent. of the oxygen of the air into watery vapor you have a partial vacum; to the extent of that 20 per cent. of oxygen in the atmosphere.

Mr. McDonald—In some of your printed matter I see that, for each foot of air you use, you would bring in a foot of outside air; for each 10 feet you use, you would bring in 2 feet. To that extent you are creating a vacuum, and that moisture appears in a gaseous form, and when it gets on the wall paper and the windows you are going to hear from your customers.

Mr. Sloan—If water was the only thing we had to contend with we would get along very nicely. I have heated my house exclusively in this way up to the beginning of this year; for three years I did not burn a single ton of coal in my furnace, and I have a house of 25,000 cubic feet capacity. I have three little children, who are very healthy and look pretty well, and we have never had any of this terrible inconvenience that Mr. McDonald speaks of.

Mr. McDonald—Is the house painted on the outside?

Mr. Sloan—No, it is not painted; it is a brick house.

Mr. McDonald—You will not have that trouble unless you paint your house.

Mr. Sloan—We do not want to do that. We are not hunting up difficulties. In intensely cold weather, when we have to run the heater pretty constantly, a certain amount of moisture is deposited on the glass in some of the rooms, but I have almost obviated that by having double sash put in, wherefore the difference in temperature between the inside pane and the air space is not great enough to deposit a great amount of moisture, and it remains in the air. When we get the temperature right, we stop burning gas. Mr. Backus, who lives on North Broad street, Philadelphia, has a house of 27,000 cubic feet capacity, which is built in between two others—my house is isolated on one side. He can heat his house with less gas than I can mine, and does not have any trouble at all. We only burn from 15 to 20 cubic feet per hour. I have experimented in Mr. Backus' house, and found that after the operation of the heater for six or seven hours continuously, in a room of about 5,000 cubic feet capacity, with three or four windows, all closed, and a guarded doorway, that the amount of carbonic acid in the air at the end of that time was only about ½ of 1 per cent. There has been no definite test made as to the amount of carbonic acid that can be in the air without detrimental effect.

Mr. McDonald—I would like to ask the gentleman if it is not true that any burner, covered with asbestos, will give exactly the same conditions as to carbonic acid, consumption of oxygen, and total amount of heat yielded, that the heater he is recommending does? I mean this: With perfect combustion secured, if all the conditions of the consumption of gas, production of carbonic acid, and leaving behind the nitrogen, are the same? If the effect of the heater on the air is in any way different from the effect of a good gas stove?

Mr. Sloan—I think it is. Take any gas stove in the market and you will find the temperature of that stove gets very much above 212°. There is more or less odor connected with a gas stove. With the Backus heater you never get any part of the apparatus above 212°.

Mr. McDonald—Where the Backus heater is used in a house that is not painted on the outside, they will go from 6 to 8 months without complaint. There is no odor. I have never had any trouble.

Mr. Sloan—I have used gas stoves for years.

Mr. McDonald—The combustion is there.

Mr. Sloan—I have used them in every room, but to heat up rapidly they have always an odor; they are always unpleasant to use. Now, that does not obtain with the Backus heater at all. I do not know how to explain it, because I have never investigated it.

Mr. McDonald—I can explain it by denying it. It is not a fact.

Mr. Sloan—Is it not a fact that my experience is just as good as yours? It is a very mysterious thing that people should be so blind to their own interest, because they want to get heat, and they are spending thousands of dollars in coal every year, and yet it is a very uncomfortable thing to do.

Mr. McDonald—I told you that I could prove it.

Mr. Sloan—Why don't you do it, then?

Mr. McDonald—I can prove it to a disinterested observer who will

watch a chemical experiment. Mr. President, I dislike to get into a disagreeable dialogue, and unless someone takes a hand I am going to drop it. I say this is a fact that no man can deny, that in combustion a given amount of gas produces a given amount of heat if the combustion is perfect. Now, this being a fact, I do not believe that that heat can be increased a particle by any device on earth, and I do not believe it can be decreased.

Mr. Sloan—Those are axioms.

Mr. McDonald—I did not know how close we were together. (Laughter.)

[To be Concluded.]

## Correspondence

[The JOURNAL is not responsible for the opinions expressed by correspondents.]

### Mr. Wood Compares His Cost Figures for Producing Calcium Carbide with Mr. Bredel's Figures.

NEW YORK, April 1st, 1895.

To the Editor AMERICAN GAS LIGHT JOURNAL:

Your editorial in issue of April 1st contrasts strongly the various estimates made of the cost of producing calcium carbide, and cites that of Mr. Bredel as being probably closer to the truth than any other, the inference being that even his estimate was below the actual fact.

As some other estimates for the production of this substance are climbing well up to the $100 mark per ton, and at the risk of developing that tired feeling, at the particular season of the year that it doth most abound, I present a short review of Mr. Bredel's article, in your issue of Feb. 25th, premising that the substance has come to stay, and the cheaper it can be produced the better will it be for the general public, in the form of isolated installations for lighting, for gas engine use, for miscellaneous power, and particularly for the propulsion of barges, canal boats, etc., in place of steam, no licensed engineer being required for the purpose of operating the plant; in fact, for whatever purpose the material is put to, in the shape of generating light, heat or power.

The estimates made of the cost of producing the calcium carbide, by the only persons who have thus far produced any quantity of it—the Electric Gas Light Company, of 45 Broadway, N. Y.—have been based upon the fact that water power for the production of the necessary electrical energy could be had for $5 per horse power per year, not only in North Carolina, Virginia and West Virginia, but in the State of New York, over 20,000-horse power having been tendered to the carbide interests for this price; and it hardly seems fair to lay any greater burden on the carbide promoters than the facts warrant.

Without recapitulating more of Mr. Bredel's article than is necessary, his sixth paragraph, from error, becomes, "Net heat required, 136.53 cal.;" which, carried forward to the first paragraph, p. 261, becomes 2,133.28 cal. per kg. The second paragraph becomes 2,453.272 cal.; the fourth paragraph, 4.81 electric horse power per kg. $CaC_2$, instead of 4.78 electric horse power; and for 1,000 kg. $CaC_2$ = 4,810 electric horse power, instead of 4,780 electric horse power, as in the close of the eleventh paragraph.

Now, $\frac{\text{4,810 electric horse power per 1,000 kgs.}}{\text{2.200462 pounds avoirdupois per kg.}}$ = 2,185.905-horse power per 1,000 pounds $CaC_2 \times 2$ = 4,371.81-horse power per short ton of $CaC_2$.

The cost, therefore, of 2,000 pounds $CaC_2$ per Bredel's estimate revised, becomes, thirteenth paragraph—

| | Revised. | Bredel's. |
|---|---|---|
| Horse power = $\frac{4{,}371.81 \times \$5}{7{,}440 \text{ hours per year}}$ = | $2.94 | $8.67 |
| 1,200 lbs. powdered coke, at $3 per ton | 1.80 | 1.80 |
| 1,900 lbs. powdered lime, 80 lbs. to the bushel, at 20 cents | .... | 4.75 |
| Ditto at 16 cents, by the quantity | 4.00 | .... |
| Cost of transferring current, or loss of 10 per cent | .29 | .88 |
| Cost of power and raw material per 2,000 lbs. $CaC_2$ | $9.03 | $16.10 |
| Cost of carbons for 4,302-horse power hours as per paragraph 19 | .... | 4.30 |
| Which would be at a rate of $103.20 per 24 hour day for carbons; or to produce 15 tons $CaC_2$ as per paragraph 12 = $6.88 per ton, instead of $4.30 as given (?) | .... | .... |
| Revised estimate on basis of 4,371.81-horse power hours | $2.23 | .... |
| Repair of furnace per ton of $CaC_2$ produced, which is at rate of $37 per 24-hour day | .... | $2.50 |
| Revised estimate | 1.25 | .... |
| Labor at furnace | 1.00 | 1.00 |
| | $13.51 | $23.90 |
| Add 40 per cent. for manufacturer's profit, etc | 5.41 | 9.56 |
| Total cost of 2,000 lbs. $CaC_2$ | $18.92 | $33.46 |

Inasmuch as the cost of packages, cooperage, draying and freight of the carbide would be the same per ton, whether the carbide was produced from water or other power, at $5 per horse power, or $50, and no manufacturer ever charges any profit on these items, I have not embraced them in my estimate. Bredel gives per ton $CaC_2$:

| | |
|---|---|
| Packing and barrels | $0.60 |
| Freights | 4.00 |
| Per ton | $4.60 |

My own estimate for these items is:

| | |
|---|---|
| Air tight barrels of a quality equal to the best sugar barrels, and 5 bbls. per 2,000 lbs $CaC_2$, at 40c. each | $2.00 |
| Cooperage, 20c. each, opening and closing | 1.00 |
| Freight, 300 miles to central delivery stations, at 1c. per ton per mile | 3.00 |
| Per ton | $6.00 |

The comparative estimates thus become:

Bredel's, $33.46 + $4.60 = $38.06

Wood's, $18.92 + $6.00 = $24.92

Wood's estimate increased to same basis as Bredel's for horse power per year, viz., $15 instead of $5, becomes $30.94.

In Bredel's article, p. 261, paragraph 12, the estimate is given as 1.6 lbs. of coal per horse power hour for run of mine coal, at $1 per ton. This evidently comprises the coal used in the engine furnishing the electrical energy alone, and does not include that used to generate the power used to drive the line shaft, crushers, elevators, pumps, fans, heating and other purposes incident to a manufacturing establishment.

In my estimate, p. 444, paragraph 8, the cost of the carbide from a steam plant is given as $19.70, this amount allowing for the consumption of 3 lbs. of $1 per ton coal per horse power hour for all purposes of power. Add 40 per cent. profit, and it equals $27.58 per ton $CaC_2$, package and freight not included. The only uncertain elements that can affect this cost are the electrolytes and furnace repairs, which, taken at the same figures as given above, bring the comparative costs—Bredel, $33.46; Wood, $32.59; not a very wide difference for two experimental estimates.

Again, 100-horse power of prime motor is required to produce 1 short ton of carbide per 24-hour day, which, furnished at rate of $15 per horse power per year, either steam or water, would bring the motor cost of the carbide to $4.84 per ton, instead of $8.67, as per Bredel, p. 251, paragraph 13. This correction would bring Bredel's cost down to $29.63 per ton, versus Wood's, $32.59; and furthermore deponent sayeth not.

M. P. WOOD, M.E., 139 W. 43d street.

## Gas Power Propulsion for Barges.

According to the London *Journal*, Messrs. Matter & Co., of Rouen, have constructed an interesting application of the "Simplex" gas moter of Messrs. Delamare-Debouteville & Malandin to river barge propulsion. The barge was the first of an intended line to serve on the Seine between Havre and Paris, carrying 250 tons of cargo. The idea was adopted of making these barges self-propelling, by means of engines driven by compressed gas, upon a plan recently illustrated in *Industries and Iron*. The moter is of the vertical two-cylinder type, developing 40 effective horse power. The store of gas, which is obtained from a small works situated on the Seine, midway between Havre and Paris, and of the ordinary illuminating description, is carried in steel tubes under a pressure of about 220 pounds per square centimeter. The barge carries 80 tubes, each weighing 715 pounds, and holding 22 cubic meters of gas. The dead weight of the tubes is therefore a serious consideration in this system of propulsion; although, both in weight and space occupied, they compare favorably with boilers and bunkers. The battery of tubes is carried on the Captain's bridge, from which the gas is

led through expanding apparatus to the engines. Should there be any leakage, therefore, it will be directly into the open air. In order to work the gas engines to the best advantage, they are arranged to be kept in regular movement in one direction; the necessary maneuvering of the barge being effected by means of a McGlasson two-bladed screw propeller. This appliance permits of any alteration of speed or direction being made by changing the set and pitch of the screw blades, which can be done directly from the bridge. The performance of the barge appears to be satisfactory; and it is considered that gas engines used in this way have a future before them for small ship and barge propulsion, as for many reasons they compare favorably with steam power for these small and slow craft.

## The Schneider Carburization Process.

A new method of cementing armor plates by means of gas has been invented by M. Schneider, of the Creusot Works. In this process two plates are placed in a very hot furnace, one above the other, with a space between them, the separation of the plates being accomplished by a frame of iron or steel placed between them. The joints between the frame and plate are made air and gas tight by the use of asbestos or some other suitable material. The furnace is closed and the cementing or carburizing gas admitted. As the cementation of the plates progresses best at the point where the gas enters, the gas is admitted at a number of points. In order to supply the carbon equally over the whole surface of the plates the gas is supplied intermittently. The pipes supplying the gas and reaching into the furnace are inclosed in other pipes filled with water in order to cool the gas.

## ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

We are in receipt of "Pamphlet No. 5," issued by Messrs. Humphreys & Glasgow, which treats of the subject of "Economical Gas Enrichment," and the matter consists of two articles that have hitherto been published. The first of these bears the caption, "Enrichment of Coal Gas," and was prepared by Mr. Alex. C. Humphreys in reply to a similarly named article by Mr. J. Ferguson Bell, that was published in the London *Journal* last May. References are also made to other contemporaneous comments by Mr. A. M. Paddon. The second paper is entitled "The Question of Economical Gas Enrichment," and it was jointly prepared by Messrs. A. C. Humphreys and A. G. Glasgow. The article was originally contributed by the authors to the London *Journal* (Nov. 6th last), and whatever else may be said about both the papers, it cannot be claimed that they are not readable or to the point; for Mr. Humphreys has—and for the matter of that always had—the clever faculty of knowing how to express himself clearly and dispassionately. The typic appearance and harmonious binding of the pamphlet are simply irreproachable.

Writing of Mr. A. C. Humphreys impels us to mention his recent election to full membership in The English Institution of Civil Engineers; but this fact must not in any sense be taken as meaning that he is any the less a full-fledged United States man, to the manner born.

The Collinsville (Conn.) Company is putting up a new retort house, which will be of iron, designed and built by the Berlin Iron Bridge Company, of East Berlin, Conn. The same contractor has agreed to construct the new Capitol avenue bridge at Hartford, Conn. This bridge will consist of two span plate girders, each 82 feet, the roadway to be 25 feet in width. There will also be two footways.

Mr. John O'Loughlin, formerly Superintendent of the Laconia (N. H.) Gas Light Company, has been appointed postmaster at Laconia.

The proprietors of the Cohoes (N. Y.) Gas Light Company have petitioned the Legislature for an order permitting them to reduce the Directorate to 5 persons.

The residents of Hollis, L. I., have voted to have the streets lighted by means of gas lamps.

Mr. James W. Patterson, in his annual report as Inspector of Illuminating Gas and Gas Meters for the Allegheny district, Pennsylvania, gives a statement showing the capital stock of each company, the number of meters in use during 1891, 1892, 1893 and 1894, the rate charged for gas and the average candle power of the same during the years noted, and the pipe mileage of the several companies at the end of 1894. The amount invested in the illuminating gas business in Allegheny county is $3,521,700, or $100,000 less than that shown by the last report, which is accounted for by the retirement from business of the West Pittsbugh Gas Company. Inspector Patterson further remarks in respect to the Company named that he does not know whether it is to be reorganized or go into liquidation. All the other companies are in a prosperous condition, and are selling gas at the lowest rates in the State. Continuing, the Inspector says: "Based on the gas supplied to the public by the Pittsburgh Gas Company for the year ended June 30, 1894 (397,787,000 cubic feet), the Companies have approximately distributed to their consumers during the past year 900,000,000 cubic feet. It is also seen that 21,741 customers patronized these Companies, being 342 of an increase over the preceding year, and indicates a growing popularity for this reliable character of illumination, and refutes the allegation often made that electric lighting is trenching on its business. The illuminating value required by law is 15 candles, while the statement will show the average to be 21.15 candle power, or 41 per centum above the legal requirement, and a slight increase over that of last year; and it will be noted that the candle power of the gas has increased every year during my incumbency, all of which indicates a care and efficiency on the part of the Gas Companies that should be appreciated by their patrons. In my last report, digressing perhaps from matters to which the report should have been limited, I took occasion to say a few words touching the relative efficiency and economy of electric lighting and gas illumination. This part of the report met with adverse criticism from some sources, but, notwithstanding, I still hold the views therein expressed, as well as the opinion that gas does not cost more than one-fourth as much as electric light, where the electric plant is operated on a paying basis; and I may say further, with Welsbach burners a real incandescent light is produced that is, in my opinion, much superior to the electric lamp now in use, and is constant for months. Electric light, however, has some special features to commend it, being clean, free from impurities, and is healthful in the fact that it does not vitiate the atmosphere in any degree, and it is fair to assume that with the advance that must necessarily be made in this character of lighting, the cost will be eventually reduced so as to bring it into competition with illuminating gas, but that time has yet to come, and up to the present time the improvement in electric light has only been an incentive to the gas companies to make a more thorough study of the manufacture of gas, its possibilities as a light giver, how to free it from impurities and increase its illuminating value. In this connection, I beg to say that poor gas is frequently the fault of bad burners. Nothing connected with the use of gas has excited more attention than the question as to how gas might be burnt to the best advantage. Great ingenuity has been manifested in the character of the many burners that have been invented, yet I am sure none of them possess the universal applicability which, in many cases, has been claimed for them, and no great expert knowledge is necessary to understand the reason. It lies in the fact that different kinds of gas require different forms of burners to effect perfect combustion; rich gases need a larger supply of air, and are best consumed from burners with fine apertures, while with poorer gases less air is needed, and hence burners with larger openings are best. Not much argument is needed to prove the statement that no single burner can be made that will possess both these requirements, and hence a burner well suited for one kind of gas is totally unfit for another; but, unfortunately, in the construction of many burners the idea seemed to have predominated that it made no difference what the size or number of orifices a certain quantity of gas would evolve a given quantity of light, while, as a matter of fact, gas may be consumed in such a way that it will yield its maximum degree of light, or none at all; and this leads to the suggestion that the character of the burner is a matter that properly belongs to the gasfitter, but I very much doubt if any of them give it the consideration it merits; but I do not doubt that fault has frequently been found with gas that only needed a proper burner to improve the light, and the meter has often been charged with error when it only records an increased volume of gas that escaped from an unsuitable burner without being consumed at all. In this view it strikes me that the remedy for bad burners is for the gas companies to take upon themselves the supply of the fittings, or, at least, of the burners. Each company will know precisely the kind of gas it is distributing, and the character of the burner suitable for it. Such arrangement would be mutually profitable, for the consumers would have a good light at a minimum cost, while the company would always be sure that the gas used was not wasted. What is said of burners in the economical consumption of illuminating gas may be said with more force when treating of fuel or natural gas. This is a case where no doubt exists in my mind of the

absolute necessity of the fuel gas companies supplying and having control of the fittings, burners, etc., used by the consumers, for the most potent reason that Mother Nature supplies this fuel, and while in the past she has been most generous and distributed with a lavish hand, carelessness and indifference on the part of consumers in their use of it have brought it to a limited state."

THE United Gas Improvement Company is under contract with the St. Paul (Minn.) Gas Light Company to furnish it with a 1,000,000-foot setting of the contracting Company's standard form of Lowe water gas apparatus, to be an essential duplicate of the plant put in some time ago for the New York and East River Gas Company, in size and detail of generators. In view of the size of this work (the largest on the market so far in 1895) the competition for the contract was brisk, and naturally the U. G. I. folks are quite elated over securing the award. The Martin sets are to be torn out, and will be replaced by this new plant, which will also largely supersede the present Springer water gas machines now in use in St. Paul. The contractors assert that when they have finished their tasks, the St. Paul Company will own the model plant of the Northwest.

THE new paint for coating iron work in and about gas plants that is now being put on the market by the New York Marine Paint Company, of Poughkeepsie, N. Y., is giving general satisfaction, and the Company is ready to fill orders for it at short notice. To show that it is known by the gas makers of the States we herewith present a list of the Companies who have tried it: Alton (Ills.) Gas and Electric Light Co.; Athens (O.) Gas and Electric Light Co.; Aurora (Ind.) Gas Light and Coke Co.; Bay State Gas Co., Boston, Mass.; Bridgeport (Conn.) Gas Light Co.; Bridgeton (N. J.) Gas Light Co.; Buffalo (N. Y.) Mutual Gas Co.; Carbon Light Co., Louisiana, Mo.; Central Gas Light Co., N. Y. city; Charlotte (N. C.) Gas Light Co.; Chicopee (Mass.) Gas Co.; Chuctanunda Gas Light Co., Amsterdam, N. Y.; Clinton (Mass.) Gas and Electrtc Co.; Coney Island (N.Y.) Fuel Gas and Light Co.; Consolidated Gas Co., N. Y. city; Consumers Gas Co., Newburg, N. Y.; Derby Gas Co., Birmingham, Conn.; Delphos (O.) Gas Co.; Elkhart (Ind.) Gas Light and Coke Co.; Fitchburg (Mass.) Gas Co.; Franklin (Ind.) Water, Light and Power Co.; Gas Light and Coke Co., New Albany, Ind.; Girardville (Pa.) Gas Co.; Greenwoods Co., Hartford, Conn.; Helena (Ark.) Gas Co.; Huntsville (Ala.) Gas Co.; Kalamazoo (Mich.) Gas Light Co.; Kansas City (Mo.) Gas Light and Coke Co.; Kenton (O.) Gas Co.; Key City Gas Co., Dubuque, Ia.; Lambertville (N. J.) Gas Co.; Lawrence (Mass.) Gas Co.; Leavenworth (Kas.) Light and Heating Co.; Logansport (Ind.) Gas Light and Coke Co.; Lock Haven (Pa.) Electric Light and Power Co.; Mahanoy City (Pa.) Gas Co.; Massillon (O.) Gas Light Co.; Mendota (Ills.) Gas Co.; Middletown (O.) Gas Co.; Monroe (Mich.) Gas Light Co.; Municipal Gas Light Co., Albany, N. Y.; Muskegon (Mich.) Gas Light Co.; New Haven (Conn.) Gas Light Co.; Northern Gas Light Co., N.Y. city; Nyack (N.Y.) Gas Light and Fuel Co.; Mutual Gas Light Co., N. Y. city; Ottawa (Ills.) Gas Light and Coke Co.; Plainfield (N.J.) Gas Light Co.; Poughkeepsie (N. Y.) Gas Light Co.; Princeton (Ills.) Gas Light Co.; Providence (R. I.) Gas Light Co.; Pueblo (Col.) Gas and Electric Co.; Richmond (Ky.) Water and Light Co., Rome (Ga.) Gas Light Co.; Rockland (Me.) Gas Light Co.; Sanford (Fla.) Light and Fuel Co.; Seneca Falls (N.Y.) Gas Light Co.; Springfield (Mo.) Lighting Co.; Standard Gas Light Co., N. Y. city; the Excelsior Coke and Gas Co., Topeka, Kas.; Lockport (N. Y.) Gas Light Co.; the L. R. Medbury Gas Works, Pontiac, Mich.; Towanda (Pa.) Gas Co.; Troy (N. Y.) Gas Co.; United Gas Improvement Co.; Wellington (Kas.) Light and Heat Co.; Westminster (Md.) Gas Light Co.

WE are in receipt of a copy of the handsome new catalogue for 1895 issued by Messrs. William M. Crane & Co., of 838 Broadway, this city. It contains illustrations of the Company's specialties in gas cooking and heating appliances, and the text accompanying the cuts tells to completeness the work which the various appliances can be counted on to do, together with amount of gas consumed, and so on.

MANY will remember the howl raised a year or more ago by some of the residents of Minneapolis, Minn., respecting the inaccuracy of the meters maintained by the local Gas Company—the quality, or inequality, of the gas supplied, was also a cause for complaint. It will also be remembered that the howling resulted in the appointment of an official gas and meter inspector in the person of Mr. A. D. Meeds. This official has had occasion to report right along that the candle power of the gas is fully 20 per cent. on the average in excess of the value laid down by the authorities, and now he is turning his attention to the meters. Commencing with the meters in the public buildings, and having tested them all, he reports that the average result shows only slight and immaterial deviation from accuracy. For instance, the meter in the Public Library, which has not been tested for five years, was in perfect condition, and that its registration was absolutely accurate.

ON the petition of the Athens (Ga.) Savings Bank and others of that city, Judge N. L. Hutchins appointed Mr. W. A. Mallory temporary receiver of the Athens Gas Light Company. His bond was placed at $10,000. The obligations of the Company are put at $35,000, and the ultimate assets will largely exceed that sum.

MR. JESSE JOSEPH has retired from the Directorate of the Montreal Gas Company, thus ending a connection with that enterprise which lasted over 30 years.

SUPERINTENDENT FLICK, of the New Castle (Pa.) Gas Company, is our authority for the statement that the Company will shortly announce a new and lower gas rate schedule.

SECRETARY VAN AUKEN, of the Cohoes (N. Y.) Gas Light Company, explains that the bill asked for by the Company from the Legislature is merely to fix by statute the number of Directors and the date of the annual meeting of the Company, which has been subject to resolution of the Board heretofore. At the annual meeting of the Company, held March 29th, the officers chosen were: President and Treasurer, Wm. E. Thorn; Secretary, D. H. Van Auken.

THE proprietors of the Atlantic City (N. J.) Gas and Water Company have awarded a contract for the construction of a new storage holder, rated to contain 250,000 cubic feet.

THREE applications for a franchise to operate a gas works at Tampa, Fla., are now before the Tampa City Council. The applicants are: A. C. Clerihew, for the United Gas Improvement Company; Messrs. Edward Manrara, Albert J. Boardman and Peter O. Knight, for the Tampa Gas Company; and Messrs. R. W. Easley, Fred. J. Cushing, Fred. D. Mayo and I. W. Phillips, on behalf of the Tampa Power, Heat and Light Company.

THE following is from the annual report of Mayor Stuart to the City Council of Philadelphia: The total expenditure of the Bureau of Gas, from 1891 to 1894, inclusive, for material, maintenance, labor, supplies, coal, etc., was $10,858,910.58, and for extensions and permanent improvements, $1,060,248.81—a total of $11,909,159.39. During the past four years there have been turned into the City Treasury as receipts from this Bureau $14,790,404.25, or very nearly $3,000,000 in excess of the entire expenditures. This is in the face of the fact that the price of gas in 1894 was reduced from $1.50 to $1 per 1,000 feet, a decrease of 33⅓ per cent. in the price. It is but just to the Bureau of Gas to state clearly that the money received by the city for its operation during the past four years not only equalled the entire sum appropriated to it during that period, including the cost of permanent improvements, but that it returned a profit over and above these expenditures of nearly $3,000,000. In the Bureau of Gas the important permanent improvements paid for out of the appropriations include the laying of 162¼ miles of gas mains, the removal of primitive benches and resetting in their places new stacks of the D. D. Fleming generating benches, the introduction of 6 of the Ross patent retort discharging machines, 7 new station meters, new building for station meters, new purifying house, office and wash house for employees, new exhaust house, rebuilding of stable, carpenter, wheelwright and paint shops (destroyed by fire June 25, 1891), the rebuilding of a sponge shed at the 25th Ward works (destroyed by fire February 2, 1893), a third lift to gasholders at the 9th Ward works, 25th Ward works and 9th and Diamond streets and 25th and Callowhill streets holder stations, and various other improvements of a minor character at each of the other gas works. The manufacturing capacity of the several works of the city has been increased during the last 4 years 4,500,000 cubic feet per day, a gain of 28½ per cent., and during this period the holder capacity has been increased 2,510,000 cubic feet, a gain of 16¼ per cent. From 1891 to 1894 the Bureau of Gas has also furnished the various municipal departments and for street lighting 2,407,308,398 cubic feet of gas, for which the Bureau receives no credit at all, and which, had the city been compelled to purchase at even one-half the price paid by private consumers, would have cost $1,649,651.

| | |
|---|---|
| Total number of gas lamps, 1891 | 16,649 |
| " " " " 1894 (an increase of 5,067) | 21,716 |
| " " " gasoline lamps, 1891 | 7,911 |
| " " " " " 1894 (an increase of 2,688) | 18,599 |

## The Market for Gas Securities.

The city market for gas shares was dull and strong during the week, Consolidated selling at 131½ to 132½, the closing sale yesterday (Thursday) having been at the latter figure. The bid price to-day is 132½. Standard preferred is up to 98 bid, offered at 100, the rise being traceable to the increasing of the quarterly dividend to a 6 per cent. per annum basis. The common is in demand at 45 bid. New York and East River securities are weak and lower. Brooklyn shares show no change, although old Brooklyn gas is gradually hardening in value. The U.G.I. Company's regular quarterly dividend of 2 per cent. is payable on the 15th inst. Chicago gas is uncertain and irregular, at 71 to 72. Bay State "fancies" are weak, and Baltimore is steady at 61½ to 62.

## Gas Stocks.

**Quotations by Close & Nash, Brokers and Dealers in Gas Stocks,**

35 WALL ST., NEW YORK CITY.

APRIL 8

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

| *N. Y. City Companies.* | *Capital.* | *Par.* | *Bid.* | *Asked.* |
|---|---|---|---|---|
| Consolidated | $35,430,000 | 100 | 132½ | 133 |
| Central | 500,000 | 50 | 140 | .. |
| " Scrip | 220,000 | .. | 100 | 102 |
| Equitable | 4,000,000 | 100 | 184 | .. |
| Bonds, 6's | 1,000,000 | 1,000 | 105 | 107½ |
| " 1st Con. 5's | 2,300,000 | .. | 112½ | .. |
| Metropolitan Bonds | 658,000 | .. | 108 | 112 |
| Mutual | 3,500,000 | 100 | 154 | .. |
| " Bonds | 1,500,000 | 1,000 | 100 | 102 |
| Municipal Bonds | 750,000 | .. | .. | . |
| Northern | 150,000 | 50 | . | .. |
| " Bonds | 150,000 | .. | 98 | 98 |
| New York and East River | 5,000,000 | 100 | 22 | 24 |
| Preferred | 2,000,000 | 100 | 41 | 44 |
| Bonds | 3,500,000 | 1,000 | 83 | 85 |
| Richmond Co., S. I. | 348,650 | 50 | 50 | .. |
| " Bonds | 100,000 | .. | .. | .. |
| Standard | 5,000,000 | 100 | 44 | 48 |
| Preferred | 5,000,000 | 100 | 98 | 100 |
| Bonds, 1st Mortgage, 5's | 1,500,000 | .. | 102½ | 105 |
| Yonkers | ..... | 50 | 112 | . |
| *Gas Co's of Brooklyn.* | | | | |
| Brooklyn | 2,000,000 | 25 | 125 | .. |
| Citizens | 1,200,000 | 20 | 65 | .. |
| " S. F. Bonds | 320,000 | 1,000 | .. | 101 |
| Equity | 2,000,000 | 10 | .. | .. |
| " Bonds | 1,000,000 | .. | .. | .. |
| Fulton-Municipal | 3,000,000 | 100 | 175 | .. |
| " Bonds | 300,000 | .. | 108 | .. |
| Peoples | 1,000,000 | 10 | 90 | . |
| " Bonds, 7's | 368,000 | .. | 100 | .. |
| " " 6's | 94,000 | .. | 98 | 100 |
| Metropolitan | 870,000 | 100 | 170 | .. |
| " Bonds, 5's | 70,000 | .. | .. | .. |
| Nassau | 1,000,000 | 25 | 200 | .. |
| " Ctfs. | 700,000 | 1,000 | 99 | 100 |
| Williamsburgh | 1,000,000 | 50 | 200 | .. |
| " Bonds | 1,000,000 | . | 107 | 110 |
| *Out-of-Town Companies.* | | | | |
| Bay State | 5,000,000 | 15 | 14 | 14¼ |
| " Income Bonds | 2,000,000 | 1,000 | 20 | 23 |
| Boston United Gas Co.— | | | | |
| 1st Series S. F. Trust | 7,000,000 | 1,000 | 73 | 74 |
| 2d " " " | 3,000,000 | 1,000 | 47 | 50 |
| Buffalo Mutual | 750,000 | 100 | 120 | .. |
| " Bonds | 200,000 | 1,000 | 95 | 100 |
| Chicago Gas Co. | 25,000,000 | 1,000 | 71¾ | 72 |
| Chicago Gas Lt. & Coke Co. Guaranteed Gold Bonds. | 7,650,000 | 1,000 | 93 | 93½ |
| Columbus | 1,069,000 | .. | .. | .. |
| 1st Mortgage | 1,085,000 | .. | .. | .. |
| Consumers. Jersey City | 2,000,000 | 100 | 72 | 77 |
| " Bonds | 600,000 | 1,000 | 93 | 96 |
| Cincinnati G. & C. Co. | 7,000,000 | 100 | .. | 203¾ |
| Consumers, Toronto | 1,600,000 | 50 | 184½ | 187 |
| Central, San Francisco | ..... | .. | 90 | 100 |
| Capital, Sacramento | ..... | .. | .. | 50 |
| Consolidated, Baltimore | 11,000,000 | 100 | 61¾ | 62 |
| Mortgage, 6's | 3,600,000 | .. | 107 | 107½ |
| Chesapeake, 1st 6's | 1,000,000 | .. | .. | .. |
| Equitable, 1st 6's | 910,000 | .. | .. | .. |
| Consolidated, 1st 5's | 1,490,000 | .. | .. | .. |
| Detroit | 4,000,000 | .. | 18 | .. |
| " Con. Bonds | 4,312,000 | .. | .. | .. |
| Equitable Gas & Fuel Co., Chicago, Bonds | 2,000,000 | 1,000 | .. | 101 |
| Fort Wayne | 2,000,000 | .. | 82 | 83 |
| " Bonds | 2,000,000 | .. | 75 | 78 |
| Hartford | 750,000 | 25 | 120 | 128 |
| Indianapolis | 2,000,000 | .. | 144 | 148 |
| " Bonds, 6's | 2,650,000 | .. | 103 | .. |
| Jersey City | 750,000 | 20 | 195 | .. |
| Lafayette Gas Co., Ind. | 1,000,000 | 100 | 86 | 88½ |
| Bonds | 1,000,000 | 1,000 | 90 | 91½ |
| Louisville | 2,570,000 | 50 | .. | 130 |
| Laclede, St. Louis | 7,500,000 | 100 | 25½ | 26½ |
| Preferred | 2,500,000 | 100 | 82 | 84 |
| Bonds | 9,084,400 | 1,000 | 93 | .. |
| Little Falls, N. Y. | 50,000 | 100 | .. | 100 |
| Bonds | 25,000 | .. | .. | 100 |
| Montreal, Canada | 2,000,000 | 100 | 200 | 208 |
| New Haven | ..... | 25 | 200 | .. |
| Oakland, Cal. | ..... | .. | 43½ | 43 |
| Peoples Gas Lt. & Coke Co., Chicago, 1st Mortgage | 2,100,000 | 1,000 | .. | 108 |
| 2d " | 2,500,000 | 1,000 | 104 | 105 |
| Peoples, Jersey City | 500,000 | 50 | 165 | 175 |
| Paterson, N. J. | ..... | 25 | 90 | 102 |
| Rochester Gas & Elec. Co. | 2,150,000 | 50 | .. | .. |
| Preferred | 2,150,000 | 50 | 81 | .. |
| Bonds, 6's | ..... | .. | .. | .. |
| Consolidated 5's | ..... | .. | .. | .. |
| Syracuse, N. Y. | 500,000 | 25 | .. | .. |
| San Francisco, Cal. | 10,000,000 | 100 | 73¾ | 73¾ |
| Washington, D. C. | 2,000,000 | 20 | 250 | .. |
| Western, Milwaukee | ..... | 100 | 44½ | 46½ |
| Bonds | ..... | .. | 81½ | 83½ |
| Wilmington, Del. | 500,000 | 50 | 188 | 190 |

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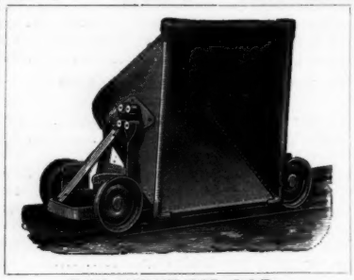

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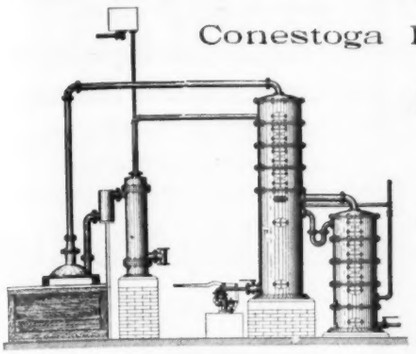

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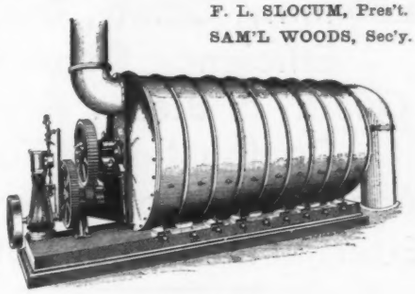

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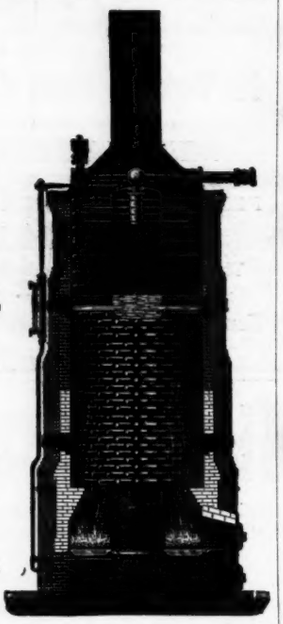

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In addition to the many improvements, we have also added a complete new line of

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This is One of Eight New Ranges.

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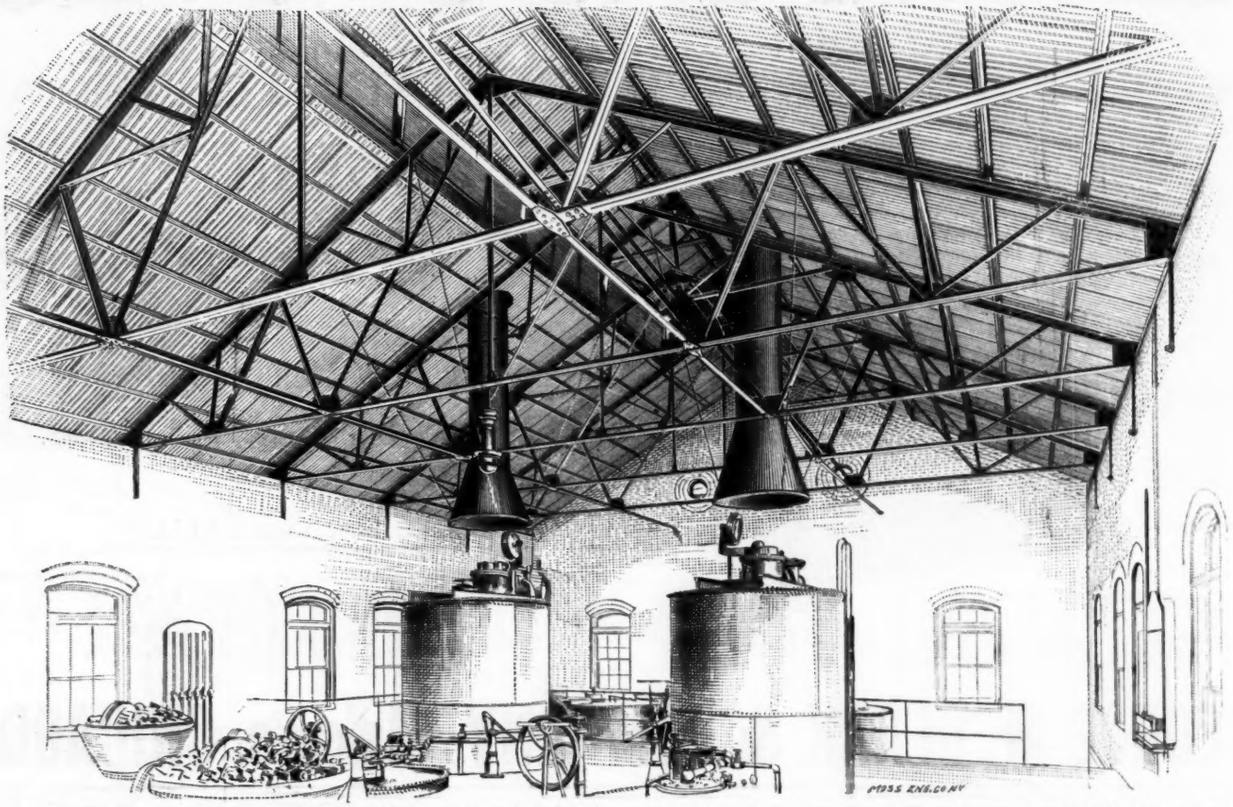

The above illustration is taken direct from a photograph, and shows the construction of an Iron Truss Roof designed and built by us for the Providence Gas Light Company, at Providence, R. I. The building is 40 ft. in width by 100 ft. in length, the side walls being of brick and the roof being entirely of iron—that is, iron trusses and iron purlins covered with corrugated iron. The building is ventilated by our Improved Ventilator, extending the full length of the roof, with side shutters opened and closed by cords from the floor. No woodwork is used in any way about the construction of the building.

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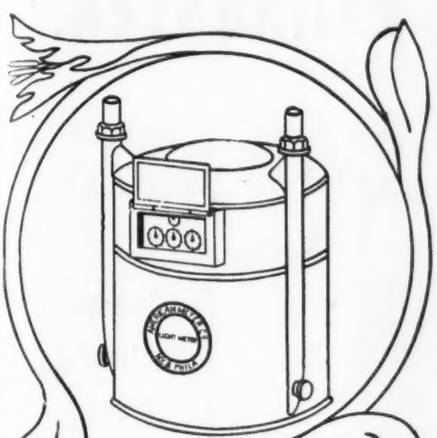

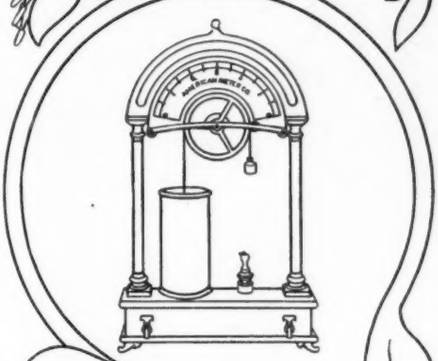

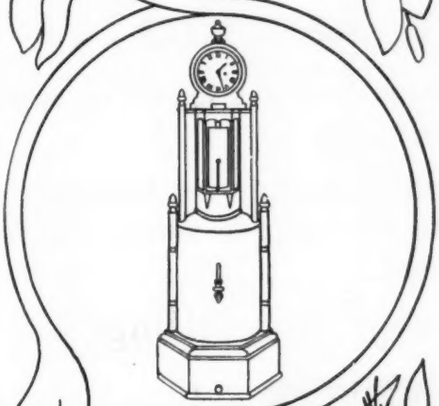

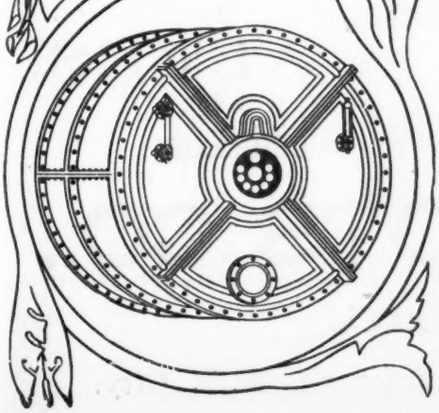

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SAN FRANCISCO.

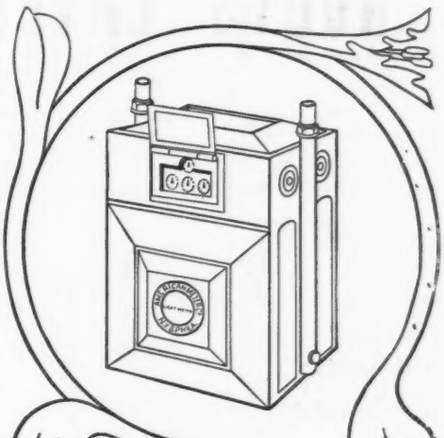
## PUBLIC LIGHTING TABLE.

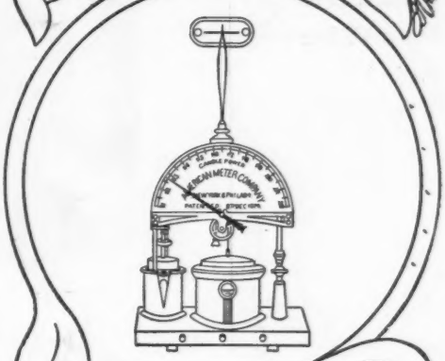
### APRIL, 1895.

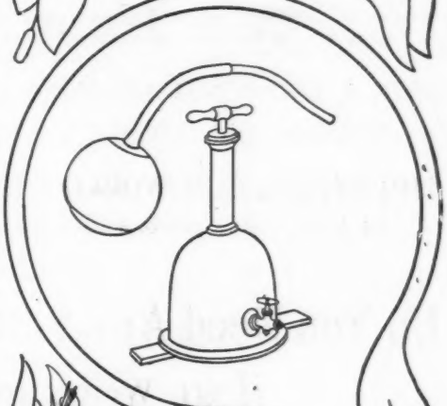
| Day of Week. | Date | Table No. 1. Following the Moon. Light. | Table No. 1. Extinguish. | Table No. 2. New York City. All Night Lighting. Light. | Table No. 2. Extinguish. |
|---|---|---|---|---|---|
| | | | | P.M. | A M. |
| Mon. | 1 | 12 30 AM | 4.40 AM | 6.10 | 4.55 |
| Tue. | 2 | 1.20 FQ | 4.40 | 6.15 | 4.40 |
| Wed. | 3 | 2.00 | 4.40 | 6.15 | 4.40 |
| Thu. | 4 | 2.40 | 4 40 | 6.15 | 4.40 |
| Fri. | 5 | 3.00 | 4.40 | 6.15 | 4.40 |
| Sat. | 6 | 3.30 | 4.40 | 6.15 | 4.40 |
| Sun. | 7 | 4.00 | 4.40 | 6.15 | 4.40 |
| Mon. | 8 | No L. | No L. | 6.15 | 4.40 |
| Tue. | 9 | No L. FM | No L. | 6.25 | 4.30 |
| Wed. | 10 | No L. | No L. | 6.25 | 4.30 |
| Thu. | 11 | 7.00 PM | 10.30 PM | 6.25 | 4.30 |
| Fri. | 12 | 7.00 | 11.40 | 6.25 | 4.30 |
| Sat. | 13 | 7.00 | 12.40 AM | 6.25 | 4.30 |
| Sun. | 14 | 7.10 | 1.40 | 6.25 | 4.30 |
| Mon. | 15 | 7.10 | 2.20 | 6.25 | 4.30 |
| Tue. | 16 | 7.10 LQ | 3.00 | 6.30 | 4.20 |
| Wed. | 17 | 7.10 | 3.30 | 6.30 | 4.20 |
| Thu. | 18 | 7.10 | 4.00 | 6.30 | 4.20 |
| Fri. | 19 | 7.10 | 4.10 | 6.30 | 4.20 |
| Sat. | 20 | 7.10 | 4.10 | 6.30 | 4.20 |
| Sun. | 21 | 7.20 | 4.10 | 6.30 | 4.20 |
| Mon. | 22 | 7.20 | 4.10 | 6.30 | 4.20 |
| Tue. | 23 | 7.20 | 4.10 | 6.40 | 4.10 |
| Wed. | 24 | 7.20 NM | 4.10 | 6.40 | 4.10 |
| Thu. | 25 | 7.20 | 4.10 | 6.40 | 4.10 |
| Fri. | 26 | 7.20 | 4.10 | 6.40 | 4.10 |
| Sat. | 27 | 7.20 | 4.10 | 6.40 | 4.10 |
| Sun. | 28 | 7.20 | 4.00 | 6.40 | 4.10 |
| Mon. | 29 | 11.10 | 4.00 | 6.40 | 4.10 |
| Tue. | 30 | 12.00 | 4.00 | 6.45 | 4.00 |

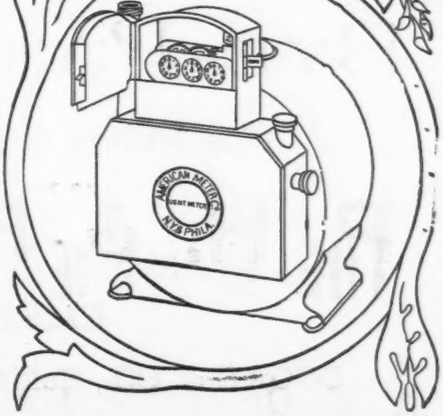
## TOTAL HOURS LIGHTING DURING 1895.

| By Table No. 1. | Hrs.Min. | By Table No. 2. | Hrs.Min. |
|---|---|---|---|
| January | 237.00 | January | 423.20 |
| February | 196.40 | February | 355.25 |
| March | 195.50 | March | 355.35 |
| April | 165.30 | April | 298.50 |
| May | 153.40 | May | 264.50 |
| June | 138.20 | June | 234.25 |
| July | 146 30 | July | 243.45 |
| August | 152.50 | August | 280.25 |
| September | 165.10 | September | 321.15 |
| October | 186.10 | October | 374.30 |
| November | 204.10 | November | 401.40 |
| December | 219.30 | December | 433.45 |
| Total, yr. | 2161.20 | Total, yr. | 3987.45 |









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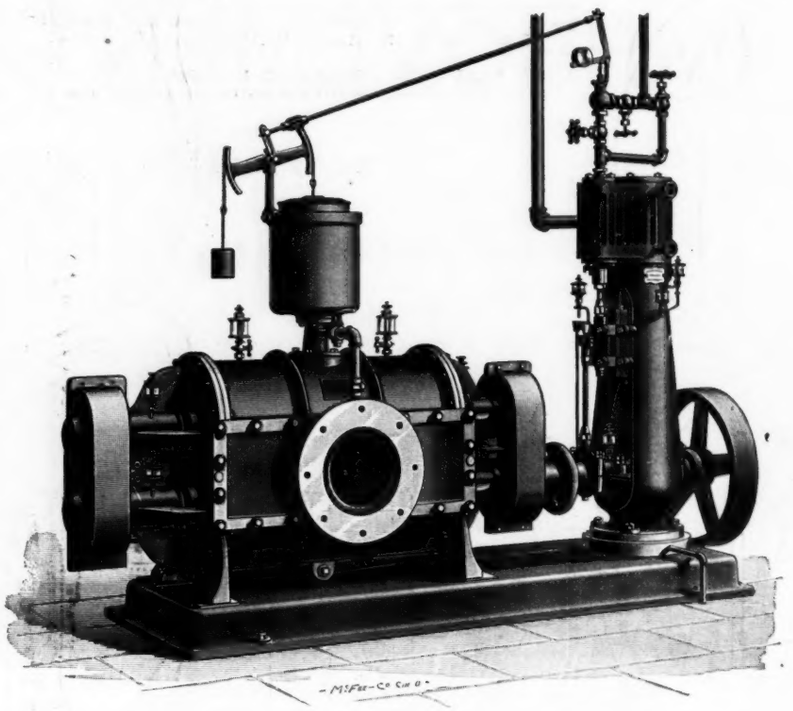

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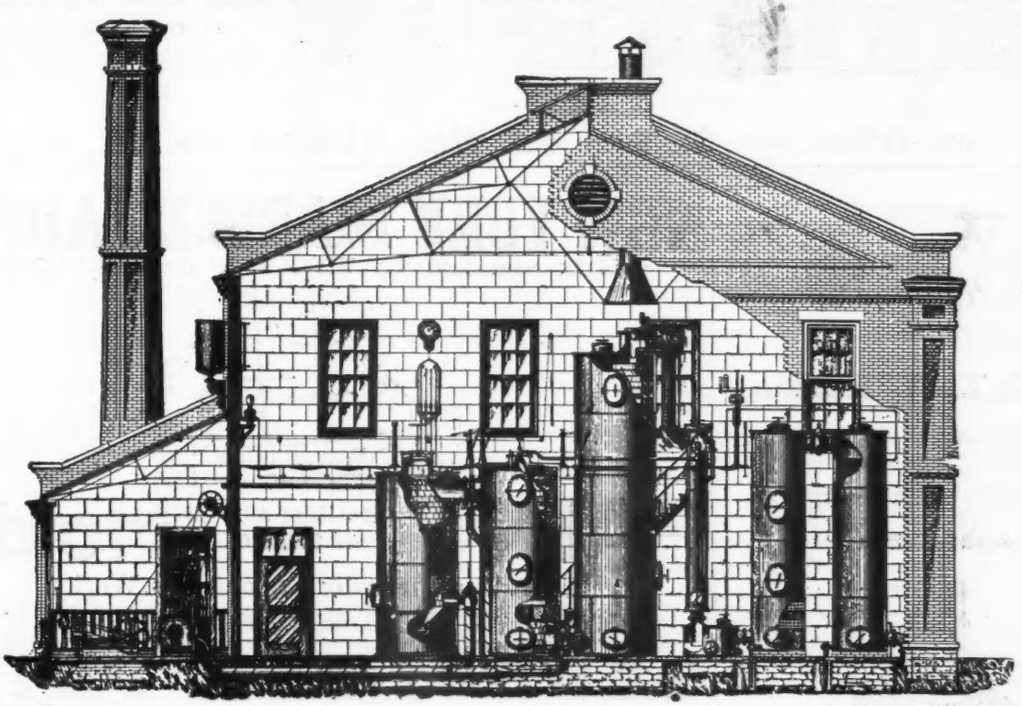

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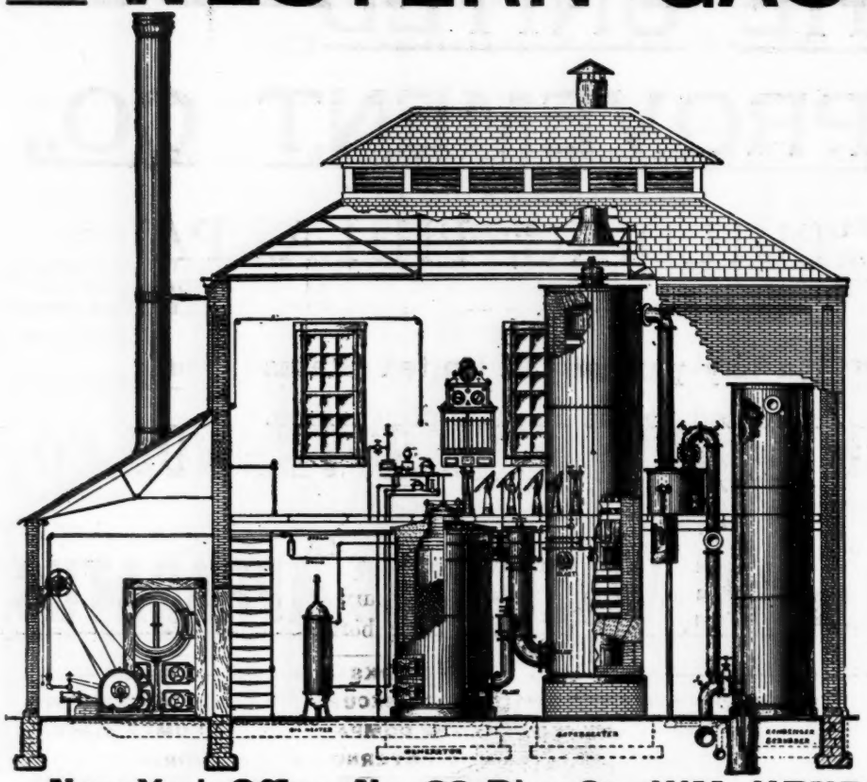

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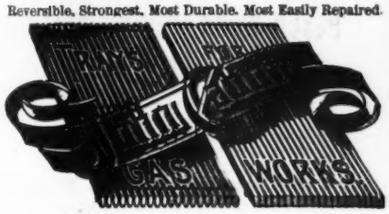


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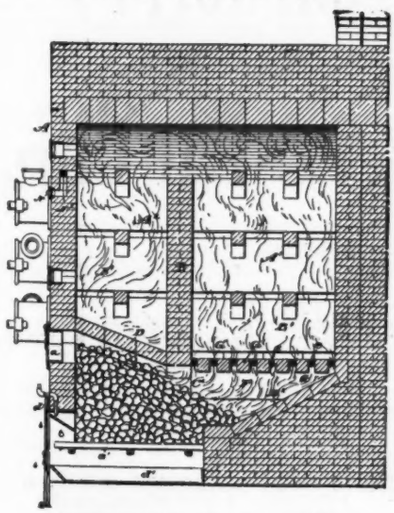

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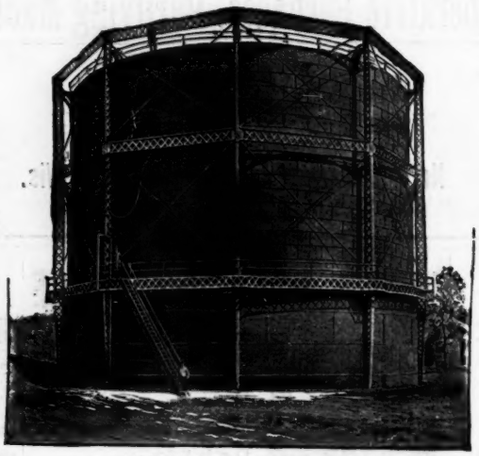

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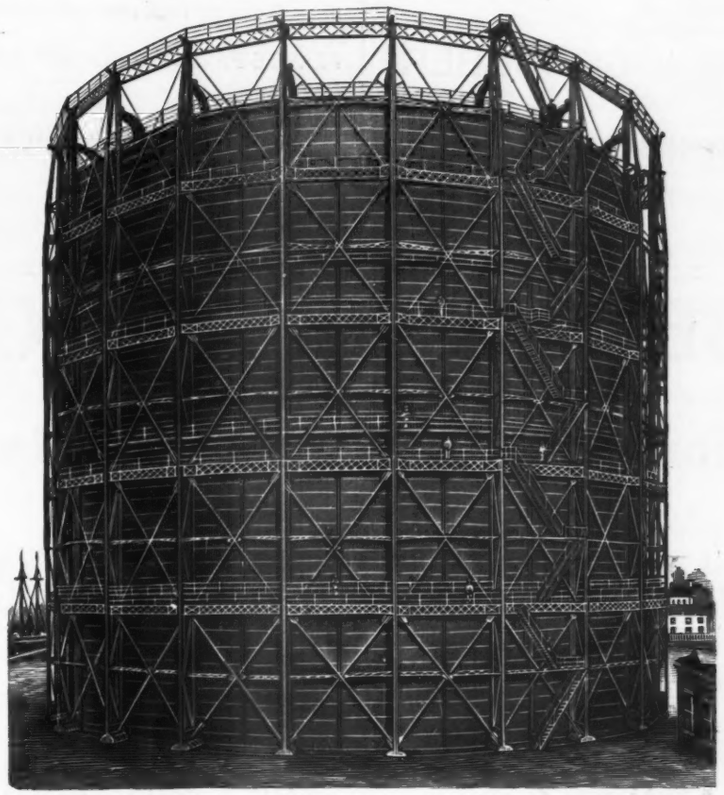

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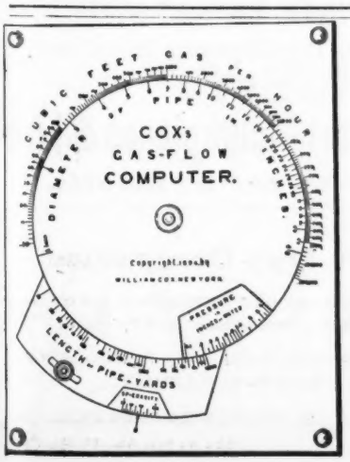


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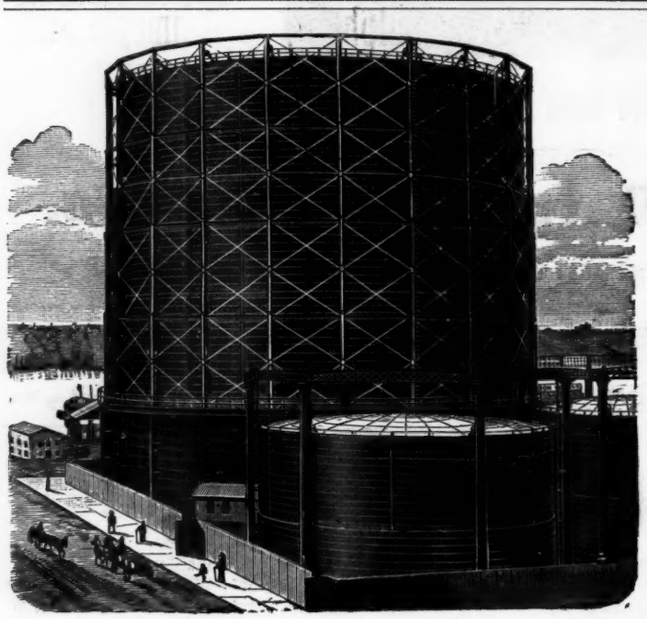

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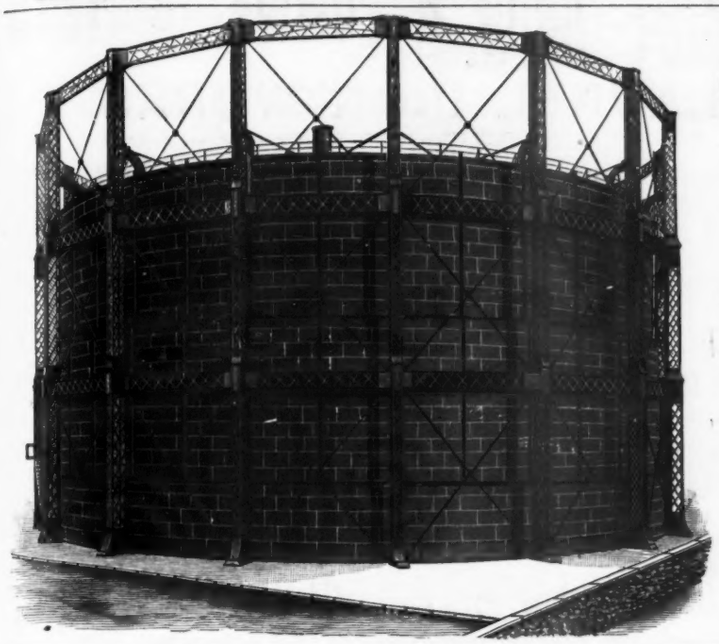

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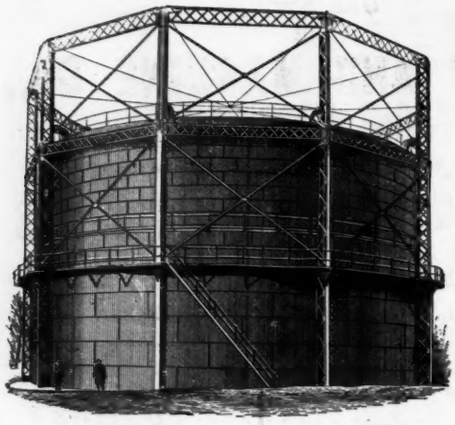

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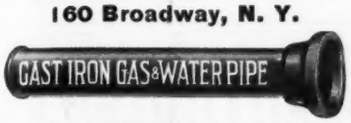


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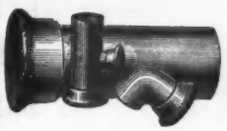

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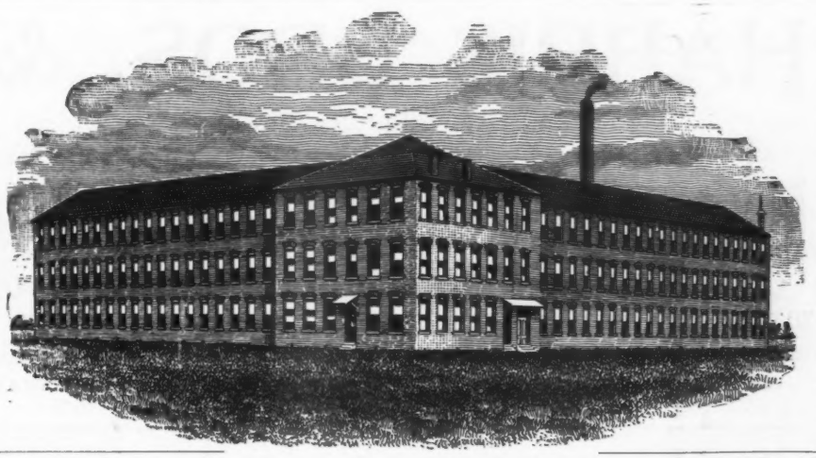

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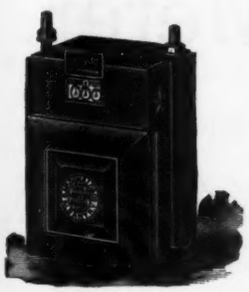

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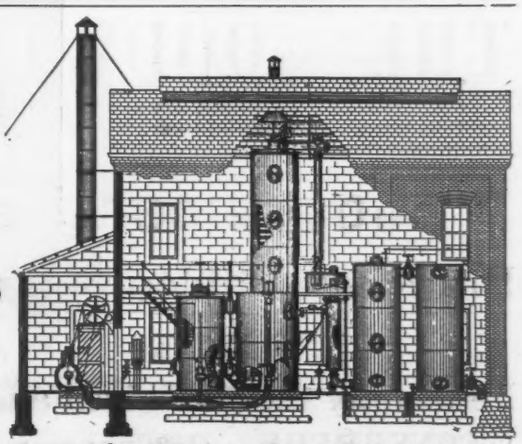

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